

KENYA COLONY AND PROTECTORATE

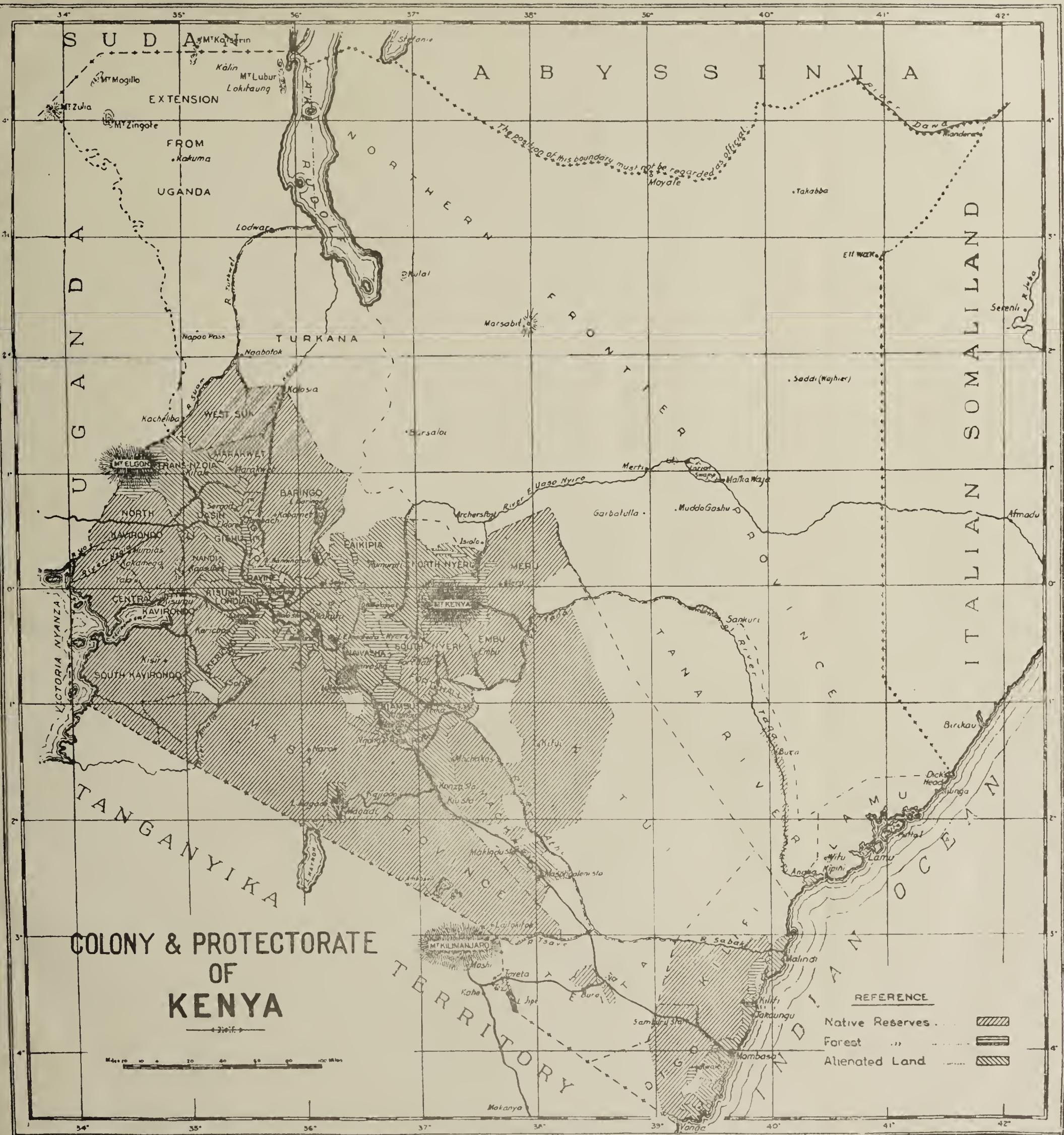


MEDICAL DEPARTMENT
ANNUAL REPORT
1932

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MEDICAL DEPARTMENT HEAD OFFICES,

NAIROBI,

11th November, 1933.

SIR,

I have the honour to submit for the information of His Excellency the Governor, and for transmission to the Right Honourable the Secretary of State, the Medical Report on the Health and Sanitary Conditions of the Colony and Protectorate of Kenya, for the year 1932, together with the Returns, etc., appended thereto.

I have the honour to be,

Sir,

Your obedient servant,

A. R. PATERSON,
Director of Medical and Sanitary Services.

*The Honourable The Colonial Secretary,
Nairobi.*

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MEDICAL DEPARTMENT ANNUAL REPORT

1932

I.—ADMINISTRATION.

The chapter in the Annual Medical Report dealing with administration can be confined as a rule to a brief statement of the principal appointments, promotions and changes which have occurred during the year, and such a statement which in ordinary years might have been sufficient for comparative purposes will be found at the end of this chapter.

For the year 1932, however, some fuller statement is required if comparison with the preceding year is not to be misleading since the year 1932 was characterized by conditions of depression which, though common to its immediate predecessor, had until then been unknown for nearly a decade during which period there had been a degree of general progress, and of commercial, agricultural and social development with which the development of the public health services, large as it had been, had not entirely kept pace. If, therefore, consideration were to be confined to administrative changes occurring as the result of unusual conditions in 1932, and the resulting situation compared only with that which pertained at the end of 1931 when conditions had been equally exceptional the cumulative effect of the depression might pass unobserved since even in 1931 the depression was so marked that by the end of that year financial provision had been seriously restricted, and important services abolished, or curtailed, though the need for such services had not diminished save perhaps in some of the smaller towns.

In reviewing the position at the end of the year 1932 it is therefore necessary to compare the administrative position then, not merely with that which pertained at the end of the year 1931, but also with the position which pertained during the preceding more prosperous years, and to review the position also in the light of the general trend of events during these years and now.

With this object in view a table is submitted in which are set out the annual financial provision for, and expenditure on, medical services in Kenya over the period 1922-1932, the numbers of professional staff retained, the numbers of out-dispensaries maintained during the same period, and, as an indication of the demand for services and the work performed, the numbers of patients treated from year to year.

In this connexion, however, and before proceeding to the analysis of the table, mention must be made of an impending change which is reflected neither in the table nor in the statement at the end of this chapter. The year 1932 was the last during which the direction of the Medical Department devolved for a full year on Dr. J. L. Gilks, during whose directorate the very remarkable changes and progress which will be referred to below took place. In 1920 when Dr. Gilks assumed control of the Medical Department of Kenya at the end of a decade during which the development of social services had been for all practical purposes impossible, though the pressing need for such services had not escaped observation, the activities of the public health service were confined almost entirely to the towns, while medical relief throughout the great native areas of the Protectorate was provided only by a few medical missions from exiguous funds. Previous to 1920 there were no Government institutions in the native reserves which could properly be termed hospitals; while only one European medical officer was posted to these areas, and there was no African staff which had been systematically trained in any fashion.

TABLE SHOWING ESTIMATED AND ACTUAL EXPENDITURE ON MEDICAL SERVICES, STAFF RETAINED, HOSPITAL BEDS MAINTAINED, AND PATIENTS TREATED ANNUALLY FROM 1922-1932

YEAR	Sanctioned Recurrent Expenditure £	Actual Expenditure £	Total Medical and Health Staff Employed	Total Qualified Nursing Staff Employed	Number of Sanitary Inspectors Employed	Number of Out-dispensaries	Number of In-patients Treated—European	Number of In-patients Treated Native and Asian	Number of Out-Patients—European	Number of Out-Patients—Native and Asian	Number of Patients Treated at Out-dispensaries
1922	177,436	137,882	39	25	12	20	1,782	—	1,583	—	—
1923	126,243	115,558	34	19	10	46	1,276	663	—	110,509	—
1924	126,593	118,811	32	23	13	62	1,337	973	151,222	185,718	—
1925	134,031	132,713	40	23	14	61	1,793	25,718	1,278	163,278	153,618
1926	178,964	161,043	43	33	16	64	2,162	29,051	1,077	185,448	—
1927	193,265	180,206	50	33	22	68	2,147	26,039	1,252	173,949	—
1928	204,801	194,814	61	37	22	82	2,555	26,915	1,239	189,420	—
1929	233,506	222,185	70	52	23	82	2,655	29,088	1,070	194,686	—
1930	250,834	236,934	72	54	22	82	2,956	35,691	2,272	220,973	—
1931	252,061	221,202	66	52	20	106	2,626	35,551	1,777	252,610	534,709
1932	219,357	197,260	54	47	16	107	2,375	31,382	1,595	261,795	646,033

In 1920, in his first Annual Report, Dr. Gilks stressed the need for the institution of medical work in the native reserves, and emphasized the necessity of a trained African staff, and he was able to secure in that year the institution of a first step towards that end, namely, the posting of a European sister to the native hospital at Mombasa.

In 1921, in Dr. Gilks' second report, the major reforms which have since taken place and many of the administrative steps necessary to secure these reforms are adumbrated: medical units in each reserve, sanitary hospital buildings and improved equipment, European nursing sisters at native hospitals, better conditions for the African staff, highly trained medical officers, and, not least, adequate motor transport.

By 1932, ten years after these reforms first began to be undertaken on an effective scale, there were fourteen medical units in the reserves, comprising well equipped hospitals under the charge of medical officers, and over one hundred subsidiary dispensaries, the European personnel in these reserves had risen from one medical officer to seventeen medical officers, nine European nursing sisters and six European sanitary inspectors where before there were none, and in addition a fairly highly trained, literate, and efficient African staff of about one thousand strong had been brought into being. The large amount of medical relief now rendered, and the equally large amount of educational work directed towards the improvement of domestic environment now undertaken, is the result of the administrative measures which began to be introduced in 1920-1922. If possible the volume of that work must be maintained, and it is in relation to the administrative measures on which that work has depended that the administrative changes entailed by the unprecedented financial restrictions of the depression which began in 1931, the full effects of which are only now beginning to be felt, must be considered, and their likely future effects envisaged so far as may be possible.

From the table submitted it will be observed that provision for Medical Services reached its highest point in 1931, and expenditure its highest point in 1930, since when there has been a reduction in the sanctioned provision for medical services of over £30,000, and a reduction in actual expenditure of nearly £40,000. Concomitantly there has been a reduction in the number of medical officers of 18 or 25 per cent, while the total number of out-dispensaries has risen from about 20 to 107, and the total number of persons to whom medical relief is rendered annually from about 180,000 to over 928,398 during the decade. It will be observed therefore that though financial provision and personnel have been largely reduced the total amount of medical relief provided has not diminished but, on the contrary, has continued to increase.

It is also a matter of satisfaction to be able to record that not only has this been so but that at the same time the standard of hospitalisation, and of the medical relief provided, which, through the prosperous years was steadily rising, has throughout the period of depression not only been maintained but has been raised still further; nor has this improvement in the amount and quality of the medical relief provided been achieved at the expense of any other branch of public health activity, for in the fields of sanitation, environmental hygiene and health propaganda there has also been increase both in the quantity and in the quality of the work performed even though here, just as in the field of medical relief, there has been in certain areas and with regard to certain types of work, complete, or almost complete, cessation of activity.

That is the bright side of the picture, but we are still perhaps nearer to the beginning than the end of the period of financial restriction; the effects of action already taken have not yet been fully felt, and to maintain a bright side to the picture may not be easy. It becomes necessary therefore to examine in some detail the factors in the administration of the department which have made it possible with reduced funds and a diminished staff to render not only more but better service in many directions, and, if we can, to estimate the likely results of present economies.

The chief factors are about a dozen in number, and each has been the object of some definite Governmental or departmental policy inaugurated in most cases towards the beginning of the decade 1922-1932 and consistently adhered to so far as was possible throughout that period.

Of these factors by far the most outstanding one is the part which the African himself has in the last ten years become able to play and is now playing in the public health service. To-day, as hospital assistants, dressers, health workers, dispensers, laboratory assistants, and storekeepers and clerks, Africans are rendering increasingly efficient service, which ten years ago could not have been rendered at all except by Europeans, or, in some cases, by Asiatics. In 1922 with but few exceptions the African staff was untrained and exceedingly inefficient. Africans were then employed only as dressers and menials, and the standard of the nursing service was poor to a degree. To-day the standard of nursing by Africans in almost every hospital is, taking everything into consideration, a high one, and as a result the amount of medical and surgical assistance which only the medical officer can render is correspondingly greater. Furthermore, as dressers at out-dispensaries, as health workers and propagandists, and as laboratory workers, and as clerks, Africans have provided the medical officer everywhere with a hundred hands where before he had only two, while in some fields, and particularly in the field of propaganda, the new hands are the more effective because they are African.

In 1922 almost without exception the African staff was illiterate, to-day an entirely illiterate African employee is rare in the department, illiterates are not recruited except as labourers, while for training as hospital assistants, that is higher grade dressers, no African is engaged unless he can write and speak English with some facility. Furthermore the African staff to-day is keen, and works harder and far more willingly than that of ten years ago.

Such advancement of the African to play a greater part in the medical service was made possible in the first place only as a result of Government's general educational policy, but it was from the beginning of the decade under review a main plank in the policy of departmental administration, and it was achieved only as a result of strict adherence to a programme devised to give effect to that policy. Essential items in that programme included the following :—

- (1) The appointment of European nursing sisters to as many native hospitals both in the reserves and elsewhere as possible.
- (2) The provision of hospital buildings of a type in which work could be efficiently performed

- (3) The provision of reasonably sanitary housing accommodation for the African staff.
- (4) The provision of a living wage for the African staff.
- (5) The provision of uniforms and working clothes in adequate amount for the African staff, and the means of keeping these uniforms and clothes clean.
- (6) The provision of equipment and material with which to work.
- (7) The provision and organization of facilities for the systematic training of African staff.

Only the last of the above items was provided with no other immediate object than the training of staff, but each one of the others without exception was essential, and the first step mentioned, namely the appointment of European sisters to the native hospitals, was taken largely with this end in view. The first occasions on which European nursing sisters were appointed to native hospitals were in 1920 at Mombasa and 1921 at Nairobi. The first occasion when a sister was appointed to a native hospital in a native reserve was not till 1928 when a sister was posted to the native hospital at Kakamega in North Kavirondo. These ladies were essentially pioneers, and they established a tradition. To them, as to many others since, a great debt is due not only for most efficient nursing service but because they were instrumental in initiating a reform which has brought untold benefit to thousands of Africans and has now enabled Government, by means of the African staff which they have trained, to meet in a fashion which would otherwise have been impossible the effects of unprecedented retrenchment among the senior staff. There are to-day nine native hospitals to which European nursing sisters are posted. At no time has retrenchment been allowed to affect this staff, and the fact that retrenchment elsewhere has been possible, and has been effected without regression, has been largely due to a consistent policy of expenditure on the employment of European nursing sisters, on the provision of housing for their accommodation, and on the provision of hospitals of a type in which they could carry out their business of nursing, and their far more important business of training others to nurse, with efficiency and economy. The systematic training of African hospital assistants in a school organized solely with that end in view came later, and its full effects have still to be felt, but the first steps, the steps which are enabling us to carry on at the present time, were those taken by the European nursing sisters in the native hospitals in the towns, and at district headquarters in the reserves, to train their dressers by the force of example to a sense of responsibility for their patients.

Before passing, however, to the question of the systematic training of Africans it is necessary to indicate more clearly the part which has been played by the provision of hospital buildings of an adequate standard of convenience.

Even so late as 1921 there were only three reasonably commodious, convenient and well built native hospitals in the Colony, namely, the native hospitals at Mombasa, Kisumu, and Kisii. Elsewhere, and even in Nairobi, there was no institution in the country which merited the name of hospital. There were only a few poor and unbelievably insanitary collections of iron or mud buildings, without convenience, dilapidated in almost every case, and bug ridden without exception. Water supplies were non-existent, and sheets and hospital clothing were only beginning to be provided. Conditions as regards accommodation and nursing were in fact little better if at all than those which prevailed during the Crimean War. Patients were not nursed, they could hardly be diagnosed; no one could have been trained to be a good dresser or nurse under the conditions which pertained, and surgery was all but impossible. It was in an institution of this kind in Nairobi rather than a year before in the better hospital at Mombasa that a European nursing sister by introducing soap and water, scrubbing brushes, discipline and example

first commenced the work of training African boys to nurse the sick. But at most other places the introduction even of such elementary reforms with success would have been impossible, the buildings such as they were, were too ruinous, too insanitary, and too inadequate in every way.

An essential step was, therefore, the provision of adequate accommodation not only where there were hospitals of sorts but at a score of places where there were none. The first of these new hospitals was established in 1920 at Kisii in South Kavirondo, one of the most inaccessible and backward of the great populous native reserves; then followed the hospitals at Machakos and Kakamega. Thereafter a large building programme was approved by Government with a view to giving effect to the director's policy of reasonably convenient, commodious and sanitary buildings for the accommodation of the sick, and new hospitals, or what were in effect new hospitals, were provided at Fort Hall, Meru, Kitui, Wesu, Kilifi, Digo, Kericho, Nyeri, Kabarnet, Muriranja's, Kiambu, Keruguya, Narok and elsewhere. The expenditure for these hospitals was met from loan funds to the extent of about £70,000, while elsewhere many important improvements were made from revenue to the extent of about £35,000.

In 1933 the last of these hospitals was completed.

The capital expenditure referred to above has been criticized on occasion though perhaps never from responsible quarters. None the less is it satisfactory to record that the evidence of the years of depression has proved its essential soundness, for without the buildings which resulted, buildings which, good and numerous as they are, are yet far from meeting in full the needs of the situation, and far indeed from luxury, it would have been entirely impossible to render any reasonably efficient service, and equally impossible to have trained the African staff which is enabling us to meet to the extent that we are doing the needs of to-day. And these better and more commodious buildings have allowed of economy also in that equipment lasts longer in good buildings where it can be properly used, and stored, than in bad ones.

Next in order of the major measures which have resulted in economy with improved service, and which shortly if need be may even allow of reduction in expenditure, is what may be termed scientific storekeeping, and this again was made possible only because capital expenditure was incurred in the erection of a good building. The new central medical store is a model of convenience which has resulted in economies whereby both money and stores go further than in the past. In the earlier, inconvenient, overcrowded building such economies would have been impossible, and without adequate equipment patients cannot be treated, nor a staff trained.

Another measure which to-day is resulting in economy and without which very little of the work which has made an efficient African staff available was that of retaining an adequate headquarters staff. It is not perhaps always fully realized to-day that the medical organization which exists in the Colony at the present time is for all practical purposes a creation of the past ten years. In 1921 there were only three native hospitals in the country which had any claim to the term, and even they were extremely ill equipped; and there was no trained African staff. The task with which the director was faced in 1920-22 was not that of directing or reorganizing a department in being, but that of organizing and building up a new machine adequate to the needs of the times. Hospitals had to be designed, equipped and organized, staff recruited and trained, and standards and routine devised and established. This work could never have been carried out unless during these years of construction it had been possible as it fortunately was to allow one of the senior officers of the department to devote practically his whole time to the business of the establishment of the new hospitals, the organization of the internal economy of the department, and last but not least the training of Africans. The machine which is withstanding the strain of financial restriction to-day is the result of the staff work then undertaken.

There has been one other personal factor, a factor of very great importance, and one without which the revolution, for it has been nothing less, in the character, outlook and capacity of the African staff could not have been achieved. This factor is the medical officer. At the end of the war the medical staff in Kenya, which had never been large, was seriously depleted; world conditions had greatly changed and the terms of service for medical officers which had never been good or in any way comparable with those offered in the great Indian and Army services, were no longer such as to attract a sufficiency of candidates. The need for an adequate supply of well-qualified medical officers was recognized by the local Government and in England, and early in the decade the general terms of service were greatly improved not only with regard to salaries but with regard to what was of even greater importance the facilities to be afforded to officers to enable them to keep up-to-date in their professional work, and to acquire additional experience and qualifications. The result has been the recruitment of an exceptionally well qualified, keen, and contented staff the members of which to the great benefit of the Colony devoted, so long as the privilege was in active operation; not only their study leave but a large proportion, and not infrequently the whole, of their ordinary leave to study; and to-day we have numerous officers very specially qualified as physicians, surgeons, ophthalmologists and in other branches of medical and public health work in a fashion which could not have prevailed had no special facilities for study been provided. These measures, and particularly the provision of study leave, were expensive, but they have in fact been economical measures of the first order, they enabled us to obtain keen and well-qualified officers capable of work of a high standard, and so the African staff has been trained, and inspired by example. And in this matter as also in the business of training African laboratory assistants for work in the hospitals and the field the provision of an adequate and well equipped central laboratory has played a great part.

Lastly, in recent years a school for the systematic training of Africans as hospital assistants, that is as dressers or orderlies capable of undertaking in an efficient manner all the duties usually carried out by a European nursing sister, has been established, and courses of instruction for dispensary welfare workers or African male health visitors have been inaugurated. The first batch of these hospital assistants and welfare workers will go into the field next year, and to no small extent they should be able to ensure that neither standards nor work fall off owing to the retrenchments and losses of the current year among the higher professional staff, and the part which they may play in the future may be very large.

To summarise : through the decade 1922-1932 that is through not only the period of prosperity but through the years of depression as well, the standard and quality of medical and public health work has steadily risen and is still rising, and the total volume of work has also increased, for though there has been complete or almost complete cessation of certain kinds of work, or a diminution of all kinds of work in certain areas, elsewhere the increase of some kinds of work at least has been very great. This increase in quantity and quality has been largely due to a remarkable increase in the efficiency of the African staff, and this increase in efficiency has been due to the administrative and financial measures which were taken throughout the decade with a view to affording to every one concerned opportunities to aim at and to achieve a high standard of efficiency.

One further result of this policy has been the fact that following on the practical demonstration in almost every reserve of what good medical relief may mean the African public through their Local Native Councils has in almost every reserve come forward with funds of their own, and in the course of the years 1925 to 1932 has shouldered a financial burden to the extent of over £27,000.

Other factors which have led to all of the results mentioned have been the provision of roads by the administration, and, in the earlier years, fairly liberal allowances for transport.

In the earlier years of the decade keenness for the real work of the reserves became ever more notable as opportunity to ascertain the needs of the people in the rural areas, and to perform work efficiently, increased, and the habit of travelling was then established. It is to the lasting credit of the staff of medical officers and sanitary inspectors that in the period of depression when the financial provision for travelling became entirely inadequate to meet the needs of the districts, and incomes as well as allowances had been reduced, no officers reduced the amount of their travelling proportionately, but all without exception continued to the utmost extent that they could afford to carry on their work at their own expense.

To-day the annual cost of the department is in the neighbourhood of £200,000 but any further reduction in expenditure is not now possible without serious curtailment of services for the reason that no matter how much the efficiency of the African staff may improve in the early future that staff will not be able for many years to come to take over the higher supervisory, directional and professional duties, and the higher staff has been reduced to the lowest limit compatible with the maintenance of existing institutions and services. Furthermore any further reductions in the facilities at present at the disposal of either the European or the African staff to render efficient service would be to strike a blow at the very foundations of efficient and economical service and would have repercussions far other than economical.

To-day the need in every direction in the interests both of the public health and of economy is for the expansion of medical service at the very earliest opportunity, for the reinstitution of the school medical service, for the reopening of stations which have been closed, and the opening up of new districts. Even in the districts where progress has been most notable and where the African staff is now doing much work which a few years ago they could not have attempted, the need for European professional and nursing staff is not less than it was, on the contrary with opportunity the need is greater, and in proportion as there has been progress so can such highly qualified professional and directional staff be economically and profitably employed, for no longer need the medical officer be both nurse and sanitary inspector, nor the sanitary inspector a mere overseer of labourers.

The most important medical administrative problem of the moment is therefore to ensure that the various factors which conditioned opportunity in the past, and have resulted in a great economy to-day, remain unaffected in any vital manner through the period of financial restriction no matter how prolonged that period may be.

(a) The following reductions in staff took place during the year :—

Medical Officers	...	...	...	...	3
Dispensers	...	...	...	...	2 Reverted to R.A.M.C.
Laboratory Assistants (Asian)	...	...	...	...	1
Assistant Surgeons (Asian)	...	...	...	...	1
Compounders (Asian)	...	...	...	...	1
Clerks (Asian)	...	...	...	...	1

The following are the principal appointments, promotions and changes made during the year :—

- (1) Dr. K. T. K. Wallington to Uganda on promotion to Senior Medical Officer.

Resignations.

Nursing Sisters	5
Clerks	1

Retirements.

Clerks	1
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Deaths.

Senior Sanitary Inspector	1
Sub. Assistant Surgeon	1
<i>Appointments Terminated.</i>				
Medical Officers	...	...	...	3
Laboratory Assistant (Asian)	...	...	...	1
Dispensers	...	...	...	2 Reverted to R.A.M.C.
Assistant Surgeon (Asian)	...	...	...	1
Compounder (Asian)	...	...	...	1
Clerks (Asian)	...	...	...	1

(b) *Legislation.*—No Ordinances primarily affecting the public health were enacted during the year.

(c) *Financial.*—The total of the sanctioned estimates for the Medical Department for the year 1932 was £219,757, a decrease of £35,942 on the previous year, but owing to the general financial situation reduction had to be effected and the actual expenditure during the year amounted only to £197,653, viz. £22,104 below the estimate as originally passed.

The comparative table of the sanctioned estimates and expenditure of the Medical Department for the past three years is as follows :—

YEAR	Sanctioned Estimates	Sanctioned Extraordinary Estimates	Total Sanctioned	Actual Recurrent Expenditure	Actual Extraordinary Expenditure
1930 ..	£ 250,834	£ 6,581	£ 257,415	£ 236,729	£ 5,037
1931 ..	252,061	1,638	253,699	221,202	1,696
1932 ..	219,357	400	219,757	197,260	393

One new vote was included in the estimates for the year, viz. "Post Mortems and Medical Examination Fees—Expenses in connexion with". This item was previously shown under the Police Department estimates.

The revenue collected amounted to £18,748 against £28,284 in 1931.

Of the total estimated expenditure in 1932 of £3,246,477 for the Colony and Protectorate, £219,757 represented expenditure on Public Health and Medical Relief, a ratio of 1 to 14.77 or 6.77 per cent.

Detailed returns of the revenue and expenditure are given in Table II at the end of the report.

II.—PUBLIC HEALTH.

GENERAL REMARKS.

The object of the annual report on the public health is to provide a reliable review of the state of the public health during the year in comparison with former years in order that the central government, the legislature, the development departments, the local health authorities, and, if possible, the public itself may be able to judge the effects of changes of circumstance, or of policy, and the results of action taken, and of expenditure incurred, and so be in a position to determine the need for further action, the lines which such action should follow, and the places and manner in which reform may be required. Such information is of particular importance at the present time when every penny of expenditure is a matter of concern, but in the case of a territory where the great bulk of the population is primitive it is, however, a difficult if not an impossible task to provide a general review which will fulfil this object in its entirety for many of the essential data are

lacking, while those which are available are seldom such as can safely be compared with the findings in previous years. For example, there are not yet available in Kenya any returns relating to births and deaths among the general population, nor any system of registration of sickness among the population as a whole. This fact that the data essential for purposes of comparison are still almost entirely lacking in Kenya can hardly be over-emphasized, for if it be forgotten, or overlooked conclusions might readily be drawn which the data presented in this report could in no way justify.

The importance of the particular data which have just been referred to was especially emphasized by the Chief Medical Officer to the Ministry of Health in England at the beginning of his report "On the State of the Public Health" for 1924, when he noted in his first chapter, which is specifically devoted to an attempt to evaluate the state of the health in England, that : "In the absence of some system of registration of sickness the only sources of information available to us in considering the state of the public health in this country (England) are the returns published by the Registrar-General relating to births, deaths and infectious disease, and the various data and records in respect of invalidity under the National Health Insurance Acts. This information is supplemented by annual and special reports of medical officers of health, and from the results of investigations by medical officers of our own department and by other departments interested in the physical, industrial and social welfare of the people."

The Chief Medical Officer then proceeds to examine four points, namely (1) the trend of population during the preceding fifty years, (2) the trend of the birth and death rates during the same period, and the age distribution of infantile mortality, (3) the incidence of the notifiable infectious disease, and (4) the incidence of minor and incipient disease. And he is able to record an increasing population, decreasing birth and death rates, remarkable decreases in the infantile mortality rate and in the incidence and mortality rates of certain notifiable infectious diseases; but he notes also that even so there still occurs in England among the insured population alone a yearly loss due to sickness which is the equivalent of twelve months' work of 447,115 persons.

So with regard to the progress of the public health in England during the past fifty years. We have been in East Africa now for about an equal period. For thirty years of that period there has been a railway through the land, and during the last ten years, at least, increasingly intensive administration. What have we to report of the state of the public health to-day? Has there been progress or regression in the last fifty years? Is the general population larger or smaller? Are birth rates decreasing, or increasing in any areas? And the general death rate, and the infantile mortality rates, what of them? What is the trend of the various diseases here? Are the people on the whole fitter, or less fit, either mentally, or physically than they were last year, or ten, thirty or fifty years ago? These are the type of questions which should be answered in a report on the state of the public health, or, if they cannot be answered, at least discussed; for they are important questions, and if the answers are still unavailable it is of importance to know why, and in the course of discussion we may perhaps discover whether our measures have been right or wrong, and our expenditure wisely directed, or perhaps not justified by the results.

But it is not easy to answer any of these questions with regard to the population of Kenya, while with regard to many, and these not the least important, not only are the answers still unknown but there are not even grounds for suggesting that the answers may be thus, or thus. We may know of reasons which might make a certain answer not unlikely, but we can seldom go further. For example up to the present we have in the first place no precise knowledge as to the trend of the population as a whole; we certainly know that factors are in operation which should retard increase, while equally we know of factors which should promote it, and we have some reason to believe that over great areas the latter are now the more effective,

but our data are not general, and for most areas they are still far from precise. We have no knowledge whatsoever as to whether the general birth and death rates are increasing or decreasing, no information with regard to the trend of many of the most important diseases, and no knowledge as to whether the people as a whole are fitter or less fit than they were last year, or ten, or fifty years ago.

It is essential that we should be perfectly clear in our minds with regard to these matters, for if we are not, and venture unjustifiably to a conclusion that by this time some particular results must have followed from some particular line of action merely because that is what has happened elsewhere then, almost inevitably, we will miss the real trend of events, and essential measures will fail to be adopted and the progress of the public health may be delayed for a long period of years. I stress this point because perhaps in no other field of work are false assumptions more likely to be made, and when made to be so dangerous and so fruitful of delay, as in the field of the public health.

If then we have no complete records with regard to the numbers of the population, its birth and death rates, and the incidence of disease, how are we to estimate the state of the public health, the probabilities as to progression or regression, and the effect of such measures as we have been able to take up to the present time?

In the circumstances detailed, and under present conditions where the collection of general records is yet to be undertaken, one course only is open to us, and that is to make as many small, but very comprehensive and detailed enquiries as we can in selected localities over as long periods as possible, to draw what conclusions may be justifiable from these enquiries, *and to review any other data which we may have collected over a wider field only in the light of these particular conclusions.*

To illustrate the importance of this point an actual example may be taken relating to the records of the current year. In his report on the health of the town of Mombasa in 1932, the medical officer of health observes that during the year no case of plague or smallpox was reported within the Municipal area, and we have reason to believe that in all probability no cases did occur though in previous years epidemics of both diseases have not been unknown. What is the significance of the statement of the medical officer of health? Does it indicate that the public health of Mombasa was good in 1932, or even that there has been improvement upon previous years? If we had no other information we might perhaps, though quite unjustifiably, come to one, or other, or both of these conclusions. But Mombasa is one of those places where a localised and fairly comprehensive, though as yet by no means sufficiently intensive and detailed local investigation has now been carried out over a period of years, and the medical officer of health had in consequence other information at his disposal, and so in discussing the incidence of infectious disease in Mombasa he also noted that : "The position in regard to tuberculosis in Mombasa is a serious one and merits the most careful consideration. The more so because of its insidious nature. Tuberculosis does not give rise to epidemics and makes no appeal to sensational public opinion comparable to that of plague, smallpox or even malaria, yet deaths attributable to tuberculosis during the decade 1922-31 were more than seven times as numerous as those of plague and smallpox put together." He does not tell us exactly how many deaths occurred from tuberculosis in 1932 as he has no reliable data on this point, but he notes that sixty cases of the disease were notified.

And so we know this with regard to the health of Mombasa in 1932, that though smallpox and plague were absent the public health was almost certainly not good either in that, or the preceding years, and we arrive at that conclusion not merely because there were a certain number of deaths from tuberculosis but because sixty cases of the disease were notified and because under the conditions which prevail in Mombasa that number of

recorded notifications of cases of this disease is a sure indication that there were many more which were not notified and that very many more people must be ill of this disease. And so though smallpox and plague were absent from Mombasa in the past year it does not follow that the folk were healthy, for the notification of sixty cases of tuberculosis suggests that they are not. But that is all that we can say; for as it happens we have no information at all as to the general death rate from all causes in Mombasa in 1932 since there is no adequate system of notification or registration of deaths in that town.

To return to the question of the estimation of the health of the population of the colony as a whole, not only was smallpox not reported from Mombasa during 1932, but it was not reported from any other part of the colony and it is probable that no case occurred. The justification for this opinion lies in the facts that all the tribes know and fear smallpox while they do not now fear vaccination, and their confidence in their medical officers now leads them as a rule to report any cases of this disease which may occur. Furthermore, though the number of medical officers is still small there is now one at least in all but two of the more important and populous districts, while in all these districts the medical officers proceed regularly on tour for longer or shorter periods every month and are in sufficiently intimate contact with the people to ensure that an outbreak of smallpox would not escape notice.

With regard to plague the position during the year has in all districts been much better than for many years past, the total number of cases having been very small in comparison with previous years while at no time did the disease become epidemic in any area. For these statements also there is good foundation, for in the endemic districts of the Kikuyu and Nyanza Provinces and in the Teita district of the Coast Province medical officers were almost constantly on tour throughout the year, and through their dispensary dressers and sanitary staff were in close touch with the people. What is the significance of this fact of a low incidence of plague? Does it mean that sanitary conditions have improved, or that the people as a whole have enjoyed better health than in previous years? Unfortunately there is no reason to believe that it means either of these things for except in some of the towns where the rat is slowly being built out no change in those domestic conditions which lead to a close association between rat and man have yet taken place on such a scale as to affect the situation, while plague is not one of these diseases to which healthy people are notably more resistant than the unhealthy. The low incidence of plague in 1932 means therefore nothing more than that for reasons with which we are unacquainted the people were fortunate, but whether the general death rate has gone down we do not know.

If we turn now from the spectacular diseases to the less spectacular, from smallpox and plague to malaria, to pneumonia and tuberculosis and influenza, to yaws and ulcers and scabies, to dysentery, and the diseases caused by the tapeworm, the hookworm and the roundworm, and by poor and scanty food, what is the record of the year?

With regard to malaria the record is that no epidemics were reported from the less malarial areas, and no increase in severity in the endemic areas, though with regard to these latter it must be noted that increases in severity there might well pass unrecorded. With regard to pneumonia we have no record of any epidemic but in our hospitals as usual more than a thousand cases were treated and several hundreds died. Of tuberculosis among the population as a whole we can say nothing except that it is not uncommon, but exactly how common we do not know. Outbreaks of influenza were more numerous and more severe than usual and in some cases accompanied by a considerable mortality.

Ulcers.—18,074 cases were treated and there is no limit to the demand for treatment, and as yet, so far as we can see no diminution in the incidence.

Dysentery is endemic in every district.

The worm diseases.—29,021 patients were treated; but if, as is not improbable, at least 50 per cent of the population actually suffer in health as a result of infection with worms while almost the whole of the population is infected, then the relief afforded to ill health though actually great must have been relatively small and the numbers of the sick must still be prodigious.

Scabies.—Approximately two-and-a-half tons of sulphur ointment were used. Treatment for scabies is popular where known and the relief to ill health must have been very great but the proportion of the total number of the infected who were treated must have been very small for the disease is almost universal among the child population.

Deficiency diseases due to poor or scanty food.—No outbreaks of disease definitely recognizable as due to dietary deficiency were recorded. On the other hand daily at every dispensary, as daily on every road, and daily at any market, could be seen folk who clearly were not well fed and equally clearly suffering in health from lack of good nourishment.

On the basis of the statements contained in the preceding paragraph we are justified in arriving at the conclusion that *the state of the public health is not as good as it might be and should be, and from our knowledge of the causes which predispose to these diseases, that by an intensification of measures it might be improved.* But by how great an intensification of measures and by what measures? But to answer that question which is of primary and fundamental importance, and in fact the sole *raison d'être* of the attempt which is made each year to estimate the state of the public health, we must be able to say not merely that the public health is not as good as it might be, but very much more precisely just how bad it is, to indicate the more important causes of ill health, and the conditions which favour the persistence of these causes, and to estimate the efficiency of the measures already in operation. No answer to these questions can, however, be found in the record so far given for that record goes no further than to indicate that certain diseases are, or appear to be, common or very common, that some patients have received indoor hospital treatment and larger numbers outdoor treatment, and that very large but unknown numbers of patients have received no treatment at all, while to some extent the record is one rather of impressions than of measurements. The impressions may be correct but they are not precise, for exact data over the wide field of the colony are still of necessity lacking.

In the absence of exact data for the population as a whole it becomes necessary therefore to have recourse to such exact data as we may have, and for preference, and if possible, to data which have been so collected that the relative importance of all factors can be determined and the course of events established over a period of years, that is we must have recourse to the results of such local but intensive investigations as may have been made.

Such local investigations are of two types, the routine investigation and the special investigation. Examples of the routine type are the investigations which are carried out by every medical officer of health who has the necessary facilities year in and year out as he collects and analyses the vital records of his area. In undeveloped countries, however, it is usually only the medical officers of health of towns who can carry out such routine investigations with any intensity over long periods of time, and from the records of one such

investigation, i.e., the records of Mombasa, I have already quoted. But our population in Kenya is only urban to a very small extent while even so the urban populations containing as they do a very large percentage of young unmarried males are of unusual constitution. So the towns can be no general guide, and we must have recourse to the rural areas if we are to find random samples which are in any way representative of the great bulk of the population. But the rural areas of the country are still organized only in a very simple and elementary fashion and the medical officers of health, that is the medical officers of the great native reserve districts, are still jacks of all trades and as a rule too busy administering their hospitals and their out-dispensaries, operating on and treating the sick, preaching hygiene, organizing latrine and housing campaigns, and dealing in a most practical fashion with the hundred and one diseases and deficiencies which call only too loudly and obviously for their attention to leave them time accurately to estimate just how much more sickness there is than they can treat, or even the mass effect of what they do. In North Kavirondo, for example, two medical officers deal with 350,000 folk, they have no time for measurements. So the records of the reports of the medical officers of health of the reserves do not ordinarily serve our purpose. Nevertheless in one or two of the smaller reserves the disproportion between staff and population is less, and from the records concerning two of these small districts some exact data can be obtained.

The coastal district with which I propose to deal for purposes of illustration is that of Digo. It is a smaller district than most and has a population only of some 50,000 while it has and has had for some time two medical officers. If we compare this provision for 50,000 folk in Digo with the provision of the same number of officers for 350,000 folk in North Kavirondo it will be clear why in one case we have now some vital records and in the other none. The Digo district has been in medical occupation since 1927, that is for five years, and it has been fortunate also in that save for two comparatively short periods the same medical officer has held the post of medical officer of health.

The population of the Digo district is composed chiefly of two tribes, the Wadigo and the Wadruma, numbering about 28,000 and 20,000 respectively. The former are an agricultural tribe, the latter tend to be more pastoral. Hookworm and malaria are rife. In 1927 and 1928 an extensive and intensive anti-hookworm and latrine campaign was carried out, since when attention has been concentrated chiefly on housing improvement, domestic hygiene, village sanitation and rural anti-malaria measures. In the first half of 1932 arrangements were put in train for the systematic collection of records with regard to births and deaths and in the second half of the year such records were collected, chiefly among the Wadigo. The following record of the results of this investigation is taken from the medical officer of health's report. The method adopted in collecting and compiling these statistics is itself of great practical interest.

"VITAL STATISTICS: DIGO COAST BELT."

With the staff available it would have been impossible to have attempted making a census and registering births and deaths throughout the whole district, so the coast belt and most of the Shimba hills area were selected because these areas were already staffed by six of the sanitary teachers. Each sanitary teacher did his own area, counting the population and registering births and deaths on his routine tour of his area each month. At the end of each month the figures were checked at Msambweni, deaths and births entered up in the registers and birth certificates filled in for distribution on the next month's round.

For the purpose of age grouping a scheme was worked out whereby the numbers in nine age groups of the two sexes could be simply ascertained.

The following table shows the method :—

Group	Males	Females	Estimated Age
1	Babies not yet having teeth ..	As in males	0-7 mths.
2	Babies having teeth but unable to walk ..	As in males	8-12 ,,
3	Children able to walk but not yet trusted to herd goats	Able to walk but unable to carry water	1-5 yrs.
4	Able to herd goats but not to be trusted to herd cows	Able to go to well and fetch small tins of water ..	6-8 ,,
5	Capable of herding cows on their own	Able to carry a debi of water and pound rice	9-12 ,,
6	Mvulana, a recognized native age group, young unmarried youths..	Msitchana, a recognized native age group ("flappers") ..	13-15 ,,
7	Young adults married and of marriageable age	As in males.	
8	Middle aged	Middle aged.	
9	Old aged	Old aged.	

This age grouping system is also employed in the registration of deaths.

The total census of the area covered amounted to 25,987, mostly Wadigo and nearly half of the native population of the whole of Digo district. This count was about 1,900 in excess of the estimated figure given by the district commissioner for the same area.

The count of 25,987 represents the number of the population at the end of the year, births having been added and deaths deducted.

DETAILS

ADULTS		CHILDREN	
Males	Females	Males	Females
5,831	6,703	7,041	6,412

Age grouped the numbers are as follows :—

Age Groups	1	2	3	4	5	6	7	8	9	Totals All Years
	0-7 months	8-12 months	1-5 years	6-8 years	9-12 years	13-16 years	Young adults	Middle aged	Aged	
Males	575	759	1,987	1,450	1,338	935	3,943	1,497	491	12,975
Females	658	823	1,977	1,517	676	758	4,812	1,422	369	13,012
Totals	1,233	1,582	3,946	2,967	2,014	1,693	8,755	2,919	860	25,967

The census and analysed vital statistics have been recorded by 'Lalos', locations, and the six areas separately for local information which need not be detailed in this report. There is a certain amount of variation in the different areas with regard to birth and mortality rates which need not be shown here because they may be more apparent than actual, seeing the calculations have been based on a six months' period June-November. When a full year has elapsed the vital statistics will give a more accurate indication of the health, etc., in the different areas.

DIGO COAST BELT

ANNUAL BIRTH RATE—

Total number births, 6 months—June–November, 1932	..	..	..	633
Mean annual population	..	..	..	25,646
Equivalent annual birth rate	..	..	..	49·36

ANNUAL DEATH RATE—

Total number deaths, 6 months—June–November, 1932	..	..	..	259
Mean annual population	..	..	..	25,646
Equivalent annual death rate	..	..	..	20·19

INFANTILE MORTALITY RATE—

Total number births, 6 months—June–November, 1932	..	..	..	633
Total number of deaths under 1 year	..	..	..	94
Infantile mortality rate per 1,000 births	..	..	..	148·5

MATERNAL MORTALITY RATE PER 1,000 BIRTHS AND STILL-BIRTHS—

Cases maternal mortality—June–November, 1932	..	..	..	7
Number births plus still-births	..	..	..	637
Maternal mortality rate	..	..	..	11

PERCENTAGE STILL-BIRTHS TO BIRTHS PLUS STILL-BIRTHS—

Number of births plus still-births—June–November, 1932	..	..	..	637
Number of still-births—June–November, 1932	..	..	..	4
Percentage still-births	..	..	..	0·63

DEATH RATES OF VARIOUS AGE GROUPS

Age Groups	Estimated Age				Death Rates
1 and 2 ..	Babies under 1 year	..	..	..	143·5
3	1–5 years	..	..	..	12
4	6–8 "	..	..	..	7·76
5	9–12 "	..	..	..	6·9
6	13–16 "	..	..	..	5·4
7	Young adults	..	..	..	9·72
8	Middle aged	..	..	..	15·6
9	Old aged	..	..	..	87·1

ANALYSIS OF THE VARIOUS DISEASES THE PROBABLE CAUSE OF DEATHS REGISTERED IN DIGO COAST BELT.

The accuracy of the probable causes of deaths cannot be vouched for because, except in a few cases seen by a medical officer, the information was arrived at by interrogation of the relatives by the sanitary teachers with regard to signs, symptoms and duration of the fatal illnesses. From a description of these the medical officer deduced the probable causes. Because of inevitable inaccuracies the table given below shows systems affected without attempting any detail.

These findings are based on the total number of deaths occurring during the period May to December inclusive.

Probable Cause of Death or System Affected during the Fatal Illness	Number of Deaths	Percentage of Total Deaths
Respiratory System	93	31
Adults—Abdominal (Digestive System) ..	24	8
Children—Abdominal (Digestive System) ..	32	10·7
Dysentery, Undifferentiated	19	6·3
Sepsis and Toxaemia	19	6·3
Senile Decay	18	6
Ankylostomiasis	12	4
Hæmoptysis, probably T.B.	12	4
Nervous System	7	2·3
Convulsions, Children	5	1·7
External Causes, e.g., Accidents	6	2
Marasmus, Children	6	2
Urinary System	5	1·7
Neoplasia	1	0·3
Alcoholic Poisoning	1	0·3
Indef. Ill Defined Diseases	7	2·3
Total	300	—

Eight deaths of women in the puerperal state are not included in the above analysis, having been dealt with already under maternal mortality.

Comparing these vital statistics with those of Uganda Protectorate for 1931, it would appear that the Wadigo are very prolific, the birth rate of 49.36 being much above that of 29.18 of Uganda. Only in one area in that Protectorate, namely Chua, in the Northern Province is the rate exceeded. Chua with a population of 78,974 has a birth rate of 53.4.

It is recognized, however, that the figure given for Digo is an 'equivalent annual' one based on the births registered during a six months' period. Still, should the number of births for the following six months be a great deal less than for the period June to November, the birth rate would still be a comparatively high one.

The death rate is slightly lower than that of the Uganda Protectorate as a whole, it being 21.75 as against 20.19 for Digo.

The infantile mortality rate of 148.5 is also lower than that of Uganda, 209.71; but that of Buganda Province is considerably lower, being 118.21.

The maternal mortality rate of 11 is also lower than that of Uganda with 14.6, but again Buganda is lower with a rate of 9.07.

The percentage of stillbirths to births plus stillbirths, 0.63 per cent for Digo, would appear to be definitely lower than anywhere in Uganda, where the average is 4.5 per cent. The nearest approach to Digo's figure is 0.87 per cent in Lango Eastern Province. However, the accuracy of the Digo returns cannot be vouched for on the six months' analysis. Special arrangements have now been made to facilitate the recording of all stillbirths in the Digo coast belt."

The medical officer of health then proceeds to attempt an estimation of the health of his population by recounting certain facts observed among an unselected sample of the population and comparing these facts with facts observed in previous years also among unselected groups. The following extracts set forth some of his results :—

"HEALTH OF THE GENERAL POPULATION, DIGO DISTRICT, WADIGO AND WADARUMA.

From year to year an effort is being made to examine as many as possible of unselected groups of natives in the district in order to gauge improvement or otherwise in the general health and to estimate the incidence of the various diseases.

During the hookworm campaign, during the resurvey the following year and again during the mass vaccination, there was little difficulty in getting large numbers of the general population *unselected* in any way as they would not have been had they attended the various centres for treatment of their diseases. It is now more difficult to get large numbers of 'unselected' natives at the centres visited on tour when there is not the urgency of a definite campaign. However, by gentle persuasion and after propaganda barazas detailed records have this year been obtained from 1,031 'unselected' natives out of a total of 3,632 who attended at the various centres for treatment or voluntarily for examination only.

Haemoglobin estimations were made on 4,849 natives, of which 3,032 were more or less 'unselected' cases as will be shown later. In the various analysis made the Wadigo and Wadaruma are given separately.

Nourishment.

The percentages given here are compared side by side with those found in 1929 when there was noted such great improvement after the hookworm campaign of 1927-1928. Records for 1930 and 1931 are not available.

	Nourishment	Wadigo		Wadaruma	
		1929	1932	1929	1932
		Per cent	Per cent	Per cent	Per cent
Adults	Good ..	62	67	51	59
"	Fair ..	36	29	40	40
"	Poor ..	4	4	9	1
Children	Good ..	54	58	51	66
"	Fair ..	44	37	47	31
"	Poor ..	2	5	2	3

Anæmia and Ankylostomiasis.

The two chief causes of anaemia in the district are definitely helminthiasis, particularly of ancylostome origin, and malaria, the latter being probably responsible for the severe anaemia found in babies and the younger children.

With regard to the incidence of ankylostomiasis, it is considered that a more accurate guide to the prevalence is obtained from the analysis of haemoglobin estimations. The incidence of ancylostome infection obtained by smear examination of faeces gives no evidence of the intensity of individual infestations, and the large majority of natives found harbouring ancylostomes are certainly not suffering from ankylostomiasis but are carriers. If a floatation method, e.g. Clayton Lane's, were adopted to count the number of eggs per gramme of stool one could get fairly accurately the intensity of the infestation, but here again, the intensity of the infestation is not always a criterion because there are believed to be other factors, such as immunity and the effect of intercurrent diseases, determining the onset of the severe anaemia and ankylostomiasis. On looking back at the records that were obtained when egg counts were made at Msambweni, it has been noted that many apparently healthy natives had much higher egg counts than certain others who were definitely suffering from ankylostomiasis.

It is believed that with Clayton Lane's technique it would be possible to find ancylostome ova in a very high percentage of natives on the coast despite the mass treatment and sanitation, but certainly there is no doubt that these measures have greatly reduced ankylostomiasis in Digo district.

The haemoglobin estimations, on which are based the anaemia and probable incidence of ankylostomiasis found in the district, must be made from 'unselected' groups of natives, because as will be shown below, the average haemoglobin percentage of sick natives attending for treatment is definitely lower than that of 'unselected' groups. The obtaining of haemoglobin averages from 'unselected' groups this year has been fairly successful because they were mostly obtained on doing the rounds of villages collecting bloods for the malaria parasite rate. Even by that method it might be argued that many of the fitter natives may have been absent from the villages cultivating their shambas at the time the rounds were made. It is just possible that the discrepancy found between the findings for 1932 and those of 1929 is due to this year's analysis being not entirely on 'unselected' groups.

HÆMOGLOBIN ESTIMATION AVERAGE PERCENTAGES

		Adult	Adult	Adults	Children	Babies
		Males	Females			
		Per cent				
Wadigo		76	72	74	64	43
Wadaruma		74	69	72	64	46

The above analysis was made from the haemoglobin estimations of 3,032 'unselected' natives.

Below is the analysis of the haemoglobin estimations of 1,083 natives attending at the various centres for treatment.

	Adult Males	Adult Females	Adults	Children	Babies
	Per cent	Per cent	Per cent	Per cent	Per cent
Average Percentage H.B. ..	69	65	67	59	45

Also are analysed for comparison the haemoglobin findings on 433 natives attending at Msambweni dispensary (before the opening of the new out-patient department).

	Adult Males	Adult Females	Adults	Children
	Per cent	Per cent	Per cent	Per cent
Average Percentage Hæmoglobin ..	70	65	67.5	59

The differences in the average percentage haemoglobin in the 'unselected' and in the 'sick native' groups is very marked.

In estimating the amount of severe anaemia in the district and getting an indication of the probable incidence of ankylostomiasis, the findings for adults are of most value because in children, particularly the younger ones, malaria and dietetics, etc., must be responsible for a definite part of the degree of anaemia found.

Taking all those adults whose degree of anaemia is 60 per cent and over 50 per cent haemoglobin as definitely anaemic and all those 50 per cent and below as markedly anaemic, a guide can be got to the probable incidence of ankylostomiasis.

DEFINITE AND SEVERE ANAEMIA IN "UNSELECTED" ADULTS

	Wadigo		Wadaruma	
	Total Estimations	904	Total Definite Anæmia	902
Total Definite Anæmia	58	6.4%	114	13%
Total Severe Anæmia	21	2.3%	10	1%

It would then appear that the probable incidence of definite ankylostomiasis is 2 per cent amongst the Wadigo and 1 per cent amongst the Wadaruma, while 6 per cent Wadigo and 13 per cent Wadaruma are on the border line.

The following table shows the comparison of the haemoglobin rates taken before the hookworm campaign and for each year thereafter.

AVERAGE PERCENTAGE HÆMOGLOBIN

	Wadigo					Wadaruma				
	Before	1929	1930	1931	1932	Before	1929	1930x	1931	1932
Adults	60%	76%	70%	70%	74%	66%	75%	71%	*	72%
Children over 2 years	59%	70%	65%	+	64%	57%	69%	64%	*	64%

*Not available.

†The average percentage haemoglobin for children for 1931 was 60 per cent, but the analysis was made on all children including babies under 2 years of age where anaemia is possibly more malarial in origin.

The average haemoglobin percentages for Wadigo adults for the years 1930 and 1931 estimated at 70 per cent is low compared with 74 per cent for the year 1932, probably because of the difficulty experienced in getting 'unselected' natives for examination.

It would appear that there is a slight fall off of 2 per cent in the average haemoglobin of Wadigo adults since the year 1929. This is to be expected despite the maintenance of latrines. In shambas which are far distant from the villages a certain amount of soil pollution must still be going on.

With regard to Wadigo children the falling off appears to have been worse. It may be that there was a greater proportion of the older children in the groups on which estimations were made in 1929 than in the following years. Later it will be seen in the analysis for the Waa Coast Technical School boys that the older boys have a higher average percentage haemoglobin than the younger ones. In future, haemoglobin records are to be taken in age groups so that a true average for children may be estimated. However, a drop is but to be expected because many parents still fail to discipline their children to the proper use of the latrines.

Fortunately, in the dry Daruma area the chances of the soil becoming intensively ancylostome polluted are not so great as in the coastal areas, because owing to reduction in the sanitary staff the maintenance of latrines in the Daruma area has lapsed very badly. The haemoglobin findings for Daruma indicate that there is a falling off from the figure attained in 1929, but it is not yet regarded as serious.

Comparison of the probable incidence of ankylostomiasis in adults as based on the amount of severe anaemia found prior to the hookworm campaign with that of 1929 and 1932 for which figures are available is shown hereunder :—

	Definite Anæmia	Wadigo			Wadaruma		
		Before	1929	1932	Before	1929	1932
		Per cent					
Severe Anæmia	39	5	6	24	8	13
Severe Anæmia	25	1	2	12	1	1

Malaria.

During the year an extensive malarial survey was carried out in the district. Two 'mosquito boys' from the Medical Research Laboratory made collections of mosquito larvae in swamps, streams, seepage areas and wells, etc., and hut to hut collections of adult mosquitos. They went on tour with the medical officer throughout the district, and while the mosquito collections were being made, large numbers of specimens of blood were taken from the general population. The mosquito larvae, the adult mosquitoes and blood slides were sent to the Research Laboratory, Nairobi, for examination and identification. All the results of the examinations and identifications are not yet to hand, but the various analyses of the results so far obtained have been compiled for this report.

Malaria Parasite Rates.

The total number of blood slides taken during the year and forwarded to the Medical Research Laboratory amounted to 3,765.

The results of the examination of 2,394 have so far been received. The remaining 1,371 are mostly blood slides from Daruma.

The lowest rate so far recorded is that of Pungu, where in March the rate for children (*c*) was 75 per cent. At Kwale, Golini, Diani, Muhaka (Oct) Msambweni and Kikoneni the parasite rates for children are all 90 per cent and over. The parasite rates for adult males (M) vary between 25 per cent and 70 per cent and for adult females (F) between 29 per cent and 54 per cent. On the average the parasite rates for adult males and females are practically the same, being 41 per cent and 42 per cent respectively.

Yaws.

The following table shows the incidence of yaws for Digo district from 1929 onwards.

PERCENTAGE OF CASES OF YAWS TO TOTAL OF NATIVES EXAMINED

No. of Yaws Cases	By Medical Officers on Tour		By Dressers at Dispensaries in District		
	Percentage of Yaws		No. of Cases Yaws	Percentage of Yaws	
	Wadigo	Wadaruma		Infective	Tertiary
1,633	56	31	3,889	23·5	28·5
1,072	64	Not available	3,303	Not differentiated	44
472	24	" " "	3,286	19	21
1,289	50	27 "	*2,734	15	19

From a consideration of the above comparisons it would appear that the incidence of yaws throughout the district is steadily decreasing. This is particularly evident in the dispensary returns where the annual numbers of new cases of yaws has dropped from 3,889 in 1929 to 2,289 in 1931, while the percentage of new cases of yaws (reckoned on total of new cases attending) has steadily declined from 52 per cent in 1929 to 34 per cent in 1932. It is noted that the reduction takes place in both infective and tertiary yaws.

Statistics obtained by medical officers on tour would tend to bear this out. In 1929 56 per cent of the Wadigo and 31 per cent of the Wadaruma were suffering from yaws, while in 1932 the percentages were found to be 50 per cent for Wadigo and 27 per cent for Wadaruma.

Tuberculosis.

Pulmonary tuberculosis.—Owing to pressure of work time was not available to examine sputa in the number of cases suspected of having pulmonary tuberculosis. A number were diagnosable on clinical grounds alone and a few were confirmed by positive sputa. To discuss the probable incidence would only be to surmise, but it is thought to be somewhere in the region of 20 per cent in adults.

The interpretation of clinical signs is complicated by the common occurrence of impaired resonance, increased vocal resonance and fremitus, and prolongation of the expiratory murmur at the right apex, in large numbers of natives who have no cough. These signs are most commonly found in anaemic people suspected of helminthiasis, but they may also some of them have early phthisis.

RETURN OF CASES—TUBERCULOSIS

	Males	Females	Total
Pulmonary Tuberculosis	84	54	138
Surgical Tuberculosis—Neck Glands ..	2	—	2

Surgical tuberculosis is so very rarely seen indicating that bovine tuberculosis is rare or does not exist in the district.

Helminths.

Because more time was devoted to the malaria survey, routine examination of stools was not done throughout the district in 1932. At Pungu, Kwale and at Waa schools, routine examinations were made. Elsewhere in the district stools were examined in cases suspected of harbouring helminths.

In all 623 specimens of faeces were examined. The analysis is given below.

NUMBER EXAMINED 623

		Number Affected	Percentage Affected
			Per cent
Helminths ..	..	476	76
Ancylostomes ..	..	309	50
Ascaris ..	..	173	28
Trichuris ..	..	231	37
Strongyloides ..	..	33	5
T. Saginata ..	..	25	*
Flagellates ..	..	2	0.3
S. Mansoni ..	..	3	0.5

*See under heading T. Saginata.

Compared with the helminth findings for 1931 when results of 635 stool examinations were analysed, there appears to be a decrease of 12.5 per cent in the percentage found harbouring aneylostomes and an increase of 2.3 per cent in the case of ascaris infections.

The question of the probable incidence of aneylostomes and ankylostomiasis in the district as a whole has already been discussed under the heading anaemia.

Ascariasis.

It is feared that throughout the district severe debility and a fair proportion of deaths result from mass infestation of round worms. 'Pot bellies' in children, not due to 'spleen caka' are often the guide to massive ascaris infections.

The condition of 'pot belly' was found in children as under :—

Wadigo, 32 per cent. Wadaruma, 31 per cent.

This percentage approximates the incidence 28 per cent ascaris found on stool examinations.

The incidence of 'pot belly' at Pungu was found to be 42 per cent. The 'pot bellied' children were requested to bring specimens of faeces for examination. Thirty-one specimens were brought and thirty of them, 94 per cent, were found positive to ascaris ova.

Very many children it is feared still defaecate around the back door where they also play and grub in the soil, and uncut dirty finger nails serve to incubate and transfer ascaris ova for reinfection.

Taenia Saginata.

The Wadigo are practically free from this helminth, because, when they do eat meat, they cook it really well. No case of 'measles' in cattle has been found on meat inspection at the Msambweni butchery.

Bilharzia.

Urinary Schistosomiasis.—Without routine examination of urines from all male youths, one cannot with any accuracy estimate the incidence of this disease.

The findings analysed below were obtained by interrogation for haematuria and microscopically proving the cause to be *S. Naematobium*.

Incidence thus found :—

		Adult Males	Male Children
		Per cent	Per cent
Wadigo	8	20	
Wadaruma	23	50	
Cases admitting hæmoturia in the past but alleging “cure”—			
Wadigo	19	3	
Wadaruma	10	—	

An indication of the true incidence is got on analysis of the Bilharzia findings amongst the pupils of the Waa village school and the coast technical school.

WAA VILLAGE SCHOOL—

Number of Urines Examined	24
Number positive to <i>S. Næmatobium</i>	18
Incidence	75%

NOTE.—Of those boys 29 per cent admitted haematuria and 10 per cent gave a history of haematuria with spontaneous “cure” giving 48 per cent possible incidence on interrogation. The remaining 27 per cent found positive gave no history.

COAST TECHNICAL SCHOOL—

Number of Urines Examined	170
Number found positive to <i>S. Næmatobium</i>	117
Incidence	69%
Various tribes are represented at the above school.	

The Incidence by Tribes was Found to be :—

Wadigo	64	per cent
Wadaruma	69	„
Warabai	78	„
Others	67	„

Venereal Disease.

Gonorrhœa.—This disease is more prevalent on the littoral, particularly around Vanga and Gazi than elsewhere in the district with the exception of the askari kanga staff who on their travels are probably apt to indulge in prostitutes.

Incidence found on examination of ‘unselected’ natives :—

	Wadigo	Wadaruma
	Per cent	Per cent
Percentage Affected ..	3	2
Percentage with Past History	11	3

NOTE.—Males were examined, females interrogated.

Complications of gonorrhœa.—Complications such as ophthalmia, orchitis, gonorrhœal arthritis, stricture of the urethra and tubal infections are seldom encountered. It may be that the infecting gonococci are much less virulent amongst the natives in Digo than amongst Europeans at home. Of seven cases of gonorrhœal ophthalmia seen, one only appeared to be very severe and likely to bring about loss of sight.

CASES RETURN

		Males	Females	Total
Gonorrhœa..	..	46	4	50*
Complications of Gonorrhœa—				
<i>G. Ophthalmia</i> ..	..	3	4	7*
<i>G. Orchitis</i> ..	..	2	—	2
<i>G. Arthritis</i> ..	..	3	—	3
Total Complications..		—	—	12

Syphilis.—Syphilis still appears to be very rare in the district.

INCIDENCE—Wadigo 0·3 per cent.

No cases were found amongst Wadaruma.

Cases Syphilis	Males	Females	Total
Tertiary Syphilis ..	3	1	4

Affections of the Mouth and Throat.

Pyorrhœa alveolaris.—This condition of the gums is rife throughout the district. As to its causation there are probably two main factors, namely vitamin deficiency, particularly in intra-uterine life and anaemia in childhood. It is believed that expectant mothers ' diet ' themselves in order that a small foetus may obviate difficulties in parturition.

On examination of ' unselected ' cases the condition was found as under :—

	Wadigo	Wadaruma
	Per cent	Per cent
Adults	83	70
Children	18	6

TOTAL NUMBER OF CASES OF PYORRHœA ALVEOLARIS SEEN

Males	Females	Total
385	311	696

In many of the cases bleeding and spongy gums were seen. In three males only was severe stomatitis seen.

Dental caries.—Much has been said about the good teeth of the African. In Digo district a 40 per cent incidence of dental caries in adults does not indicate good teeth. Much literature has recently been published on the causation of dental caries. If the condition is entirely due to lack of vitamins, an ill balanced diet with excess of cereals, there is a ready explanation for the high incidence in Digo district. It is a wonder that the incidence is not higher. It possibly is higher because neither a dentist's chair nor hand mirror was used in the examinations. The teeth most commonly showing caries were molars.

INCIDENCE FOUND—

Dental Caries	Wadigo	Wadaruma
	Per cent	Per cent
Adults	40	40
Children	20	16

... Total Number of Cases Seen—

Males	Females	Total
174	191	365

Enlarged tonsils.—

Incidence Found			Wadigo	Wadaruma
			Per cent	Per cent
Adults			4	6
Children			6	9

Total Cases Seen—

Males	Females	Total
76	21	97

Follicular tonsilitis.—

	Males	Females	Total
	4	—	4
Total ..	—	—	101

Adenoids.—Fourteen males were seen in which the condition was at all marked.

Diseases of the Skin.

Scabies.—Scabies is the most common skin disease met with. It is a wonder that it is not more prevalent.

	Incidence	Adults	Children
		Per cent	Per cent
Wadigo		6	18
Wadaruma		3	22

Diseases of the Eye.

Pterigium in no cases of any severity and apparently giving no inconvenience was found as under :—

		Adults	Children
		Per cent	Per cent
Wadigo		31	5
Wadaruma		22	—

Other eye affections were found as under :—

	Wadigo		Waadarmu	
	Adults	Children	Adults	Children
	Per cent	Per cent	Per cent	Per cent
Conjunctivitis	4	6	9	3
Corneal Ulcer	0.3	1	—	—
Corneal Scarring	2	1	1	—
Cataract	6	—	3	—
Entropion	—	—	6	—

Uleers.—Ulcers the causes of which are considered not to be yaws are fairly common but not to the extent met with amongst contract labour on estates.

Incidence of ulcers including those believed to be of yaws origin :—

	Adults	Children
	Per cent	Per cent
Wadigo	8	14
Wadaruma	4.5	9

Turning to the report of the medical officer of health for the Teita Reserve, a small district inland from Digo, where, though no general records are available, some local records are given which are of particular interest and may be extracted. The first extract which gives the infantile mortality rate for a population of 1,170 families in a fairly progressive area, where, however, there were only thirty improved huts, is as follows :—

" Infant Mortality—Teita.

The Bura area is one where plague has been endemic until the end of the year 1930, where yaws was rife and helminthiasis and malaria was rampant. It is of great interest therefore to follow up the infant mortality rate in this area as it gives a reflex to that of the reserve. For the half-year ending 30th June, 1932, the infant mortality rate was 167.5 per 1,000 live births. For the quarter ending 30th September, 1932, it was 55.5 per 1,000 live births and for the last quarter of the year 181.8 per 1,000 live births.

This gives an infant mortality rate for 1932 of 150.9 per 1,000 live births.

The number of families Christian and pagan from which the above calculations were made was 1,170.

The total number of births to June 30th was 77.

The total number of deaths to June 30th was 33.

For the year 1932 : Total births were 106.

Total Deaths were 52.

Population, 1st January, 1932 : 3,081.

Increase of population was therefore 1.75 per cent."

The second is of particular interest as the reporting officer was stationed in the district throughout the two years to which he refers.

" Helminthiasis.

The establishment of pit latrines in this district has undoubtedly reduced the incidence of worm infection and with this is associated the giving of santonin and carbon tetrachloride to hundreds of natives. During the examination (routine) of stools in the hospitals I have particularly noticed the diminution in the number of eggs of ascaris as compared with the examinations of last year. I do not think that pit latrines and santonin alone will rid the population of their worms. The child is one factor, he or she cannot use a latrine, personal cleanliness after defaecation is another, the cutting short of the nails is another. So that the prosperity of the people with an increased desire for soap and water, etc., enters into the question of the riddance of worms or the remaining of a carrier state only.

The following cases of helminthiasis were treated during the year :—

	Males	Females	Total
Ascaris	682	993	1,675
Tænia	165	70	235
Ankylostome	30	18	48
Ascaria and Tænia	12	3	15
Ascaris and Ankylostome	1	3	4
Ascaria, Tænia and Ankylostome	1	1	2
Ankylostome and Tænia	4	2	6

Total number of cases 1,985 as against 2,890 in 1931.

(I) GENERAL DISEASES.
MALIGNANT DISEASE.

Each year shows an increasing number of cases of malignant disease reported amongst the native population. The total number in 1932 was 127 as compared with 104 in the previous year. Of this number 108 occurred in Africans. This figure cannot be taken as indicating in any way the true incidence of the disease in the Colony and it provides no basis for comparison with other races. Malignancy is associated with old age and chronic ill health and under these two conditions the native is less frequently seen in hospital where alone an accurate diagnosis can be made. From such records as are available it appears that cancer occurs at an earlier age in natives than it does in Europeans. This is in keeping with established facts concerning the disease when the earlier onset of old age in the native is taken into consideration.

Amongst other noteworthy points brought out by the records are :—

- (1) The remarkably low incidence of intestinal carcinomata.
- (2) Primary carcinoma of the liver is common.
- (3) Skin cancer is the predominant malignant tumour amongst the native population.
- (4) Sarcomata form a higher percentage of malignant tumours amongst the native population than is found amongst white races.

Sixty-nine specimens from native patients were examined during the year at the Laboratory, with the following results :—

Carcinoma	...	...	...	...	...	19
Epithelioma	...	...	...	...	...	18
Mixed tumour of Parotid	...	...	...	...	...	2
Sarcoma	...	...	...	...	...	10
Endothelioma	...	...	...	...	...	5
Melanoma	...	...	...	...	...	12
Myeloma	...	...	...	...	...	1
Teratoma	...	...	...	...	...	2

The predominance of skin cancer is perhaps significant if we take into consideration the extent to which the native skin is subject to chronic irritation from dirt, and small but improperly treated injuries. If dirt and injury play, as is not improbable, any considerable part in determining the incidence of cancer among Africans then, though the position as regards the treatment of cancer in Africa is no different from the position elsewhere, the position as regards prevention is much happier for in Africa soap and water and first aid may not improbably prove to be measures of first class importance in the prevention of cancer as in the prevention of other diseases.

Another point may be noted in connexion with the sites of primary cancers in Africans. Among Africans in Kenya primary carcinoma of the liver is much commoner than among Europeans elsewhere. Looking for a reason for this unusual incidence one remembers that some degree of cirrhosis of the liver is far from rare in Africans and that it has been suggested that such cirrhosis may in many cases be attributable to infection with intestinal worms. If this hypothesis should be true then in the case of carcinoma of the liver as in the case of carcinoma of the skin, prevention might again be achieved by the adoption of a simple sanitary measure—the pit latrine.

NEPHRITIS.

During the year a certain number of cases of nephritis were as usual recorded. No detailed information has been obtained with regard to the majority of these cases, but with regard to thirteen cases of acute nephritis which occurred at one hospital the following note may be quoted :—

“ Nephritis cases conform very closely to one type. They occur in children of either sex between the ages of three and twelve years. Marked oedema of the whole body, especially the face and legs, is the

rule, and ascites occurs in about three-quarters of the cases. The urine on the whole appears to be diminished in quantity but varies much in different cases, and from time to time in the same case; albuminuria is marked. Constipation is usually extreme. Most cases gradually improve in hospital, about 20 per cent die."

An association between quartan malaria and nephritis is suggested by the fact that in these cases of nephritis 67 per cent were infected with quartan malaria, the incidence of quartan malaria in all other children admitted to the same hospital during the year being only 8 per cent.

The matter appears worthy of further investigation.

DEFICIENCY DISEASES.

The figures for diseases the results of nutritional deficiencies are as follows :—

Scurvy	...	...	...	...	...	51
Beri-beri	...	...	...	...	...	3
Rickets	...	...	...	...	...	12
Pellagra	...	...	...	...	...	2

These figures are unfortunately as misleading as figures can be. Cases of definite deficiency disease are undoubtedly rarely seen in the native hospitals, but on the other hand the proportion of the population which is ill nourished is very high and particularly is this the case among the child population. In support of this statement reference may be made to the figures already quoted for the Digo district, where the non-nourishment was found to be as follows :—

For adult Wadigo : Good, 67 per cent ; Fair, 29 per cent ; Poor, 4 per cent.

For children : Good, 58 per cent ; Fair, 37 per cent ; Poor, 5 per cent.

Further support is also provided by the Digo figures for pyorrhoea and dental caries which it will be remembered were 83 per cent and 40 per cent respectively.

(II) COMMUNICABLE DISEASES.

MOSQUITO OR INSECT BORNE.

Malaria.

There was no unusual incidence of malaria during the year save in Mombasa, where a small epidemic occurred during the second and third quarters of the year.

The total number of cases treated at hospitals and dispensaries during the year was 18,562 as against 28,507 in 1931. These cases were classified as follows :—

Tertian	...	...	...	...	...	807
Quartan	...	...	...	...	...	876
Aestivo-autumnal	...	...	...	...	...	5,134
Undifferentiated	...	...	...	...	...	334
Clinical	...	...	...	...	...	10,407
Cachexia	...	...	...	...	...	999
Cerebral	...	...	...	...	...	5

In addition many thousands of cases must have received a certain modicum of treatment at the numerous small out-dispensaries scattered throughout the native reserves and from settlers on farms and managers on estates. Exactly how many thousands of cases of malaria received such treatment at out-dispensaries cannot be stated, as the returns from these dispensaries are not in all cases sufficiently detailed, but as over 600,000 Africans were treated at these centres and one of the commonest complaints of those who attend is " fever " and the majority of the reserves are malarial,

the number of cases must have been very large, possibly somewhere between two and three hundred thousand, or even more. The standard of treatment provided at these out-dispensaries is slowly improving. Some years ago out-dispensary treatment was largely limited to a dose of quinine taken at the dispensary. Such "treatment" is rare now. Bottles are commoner in the reserves to-day even in the most outlying areas, and in almost all cases to-day the patient appears with a bottle, or if he does not, is told to bring one. No quinine is issued till he does and invariably he returns.

Even, however, if say three hundred thousand persons are "treated" for malaria once annually the amount of treatment provided is small in proportion to the need. The population of the country is over 3,000,000 and all but a very small part of that population not exceeding say 400,000 live in areas where malaria is endemic; a low parasite rate for children in a coastal district was it will be remembered 70 per cent, not improbably therefore at least half of the remainder, that is between one and two million people, suffer from malaria not once but many times during the year. The total amount of quinine issued to hospitals, dispensaries and post offices during the year was over 11,000,000 grains valued at £3,224. This amount of quinine if it had been taken in the form of seven-days treatments of thirty grains per day would have been sufficient for the treatment of slightly over 50,000 cases. To treat a million cases in this fashion would at present prices have cost over £60,000 for quinine alone. Arrangements are being made to try a large scale experiment with quinine febrifuge in 1933 with a view to making funds go further but it will be clear from the facts quoted above that till the people are more prosperous and centres for treatment many times more numerous than they are at present, the extremely important matter of treating malaria with quinine will remain the exception rather than the rule. At the present time the great proportion of the hundreds of thousands of cases of malaria which occur annually in the colony still go untreated with quinine.

Blackwater.

The comparative table of cases treated by the Government medical staff for the past five years is as follows :—

				<i>Cases.</i>	<i>Deaths.</i>	
1928	...	...	...	35	...	13
1929	...	...	...	38	...	11
1930	...	...	...	50	...	8
1931	...	...	...	41	...	10
1932	...	...	...	52	...	2

Plague.

Only 281 cases of plague were reported as having occurred in the colony during the year as against 604 in 1931 and 959 in 1930. Of these cases the majority occurred in the Keruguya area of the South Nyeri district of the Kikuyu Highlands, while only 51 sporadic cases were reported from the old endemic areas in the Kavirondo districts of the Nyanza Province. The total number of cases occurring was almost certainly greater than the number reported, but as notification becomes better each year the fact that the total is less than half the total number reported in 1931 undoubtedly indicates a real reduction in incidence.

The records for the past ten years are as follows :—

1923	...	1,161	1928	...	561
1924	...	555	1929	...	763
1925	...	1,101	1930	...	959
1926	...	524	1931	...	604
1927	...	327	1932	...	281

Mombasa remained free of plague throughout the year and in Nairobi only seven cases occurred.

Trypanosomiasis.

The total number of new cases reported during the year was 65. The majority of these cases occurred in South Kavirondo.

Relapsing Fever.

The comparative figures for reported cases are as follows :—

<i>Year</i>	<i>Cases</i>
1930	62
1931	74
1932	90

Typhus.

The total number of cases reported was eight.

During the year an investigation into the question of the vector of this disease in Kenya was carried out at the laboratory, from which it would appear that the tick *Rhipicephalus sanguineus* is a vector. As the dog is the main host of this tick a method of prevention is suggested by the research.

INFECTIOUS DISEASES.

Pneumonia.

The comparative table of admissions to Government hospitals for the past five years is as follows :—

	<i>Admissions</i>	<i>Deaths</i>	<i>Death rate per hundred</i>
1928	1,314	362	27·5
1929	2,175	398	18·3
1930	2,014	389	19·2
1931	1,628	373	22·9
1932	1,363	311	22·8

Smallpox.

The Colony and Protectorate remained completely free from smallpox during the year 1931. A similarly satisfactory state of affairs prevailed in 1932.

Syphilis.

The total number of cases which were under treatment during the year was less than in 1931. The decrease is, however, probably without significance.

The comparative table is as follows :—

1928	...	24,442	1930	...	25,205
1929	...	18,496	1931	...	23,733
		1932	...	21,299	

Yaws.

The decrease in the numbers of patients treated noted during 1930 and 1931 has continued and as the decrease is again large it is possibly significant. The comparative table is as follows :—

1927	...	70,253	1930	...	103,711
1928	...	85,617	1931	...	92,050
1929	...	89,615	1932	...	80,126

Support for the suggestion that the decrease in numbers treated may indicate a diminution of the disease is to be found in the figures quoted with regard to the coastal district of Digo.

Tuberculosis.

The comparative table is as follows :—

1929	...	676	1931	...	874
1930	...	756	1932	...	886

These are the total numbers of cases seen at all hospitals and dispensaries throughout the country among a population of over 3,000,000, but it is beyond doubt that they in no way serve to indicate the prevalence of tuberculosis in the colony as a whole; again reference may be made to the figures for Digo where the medical officer of health estimates the incidence at 20 per cent. In some districts, however, this disease is said to be very rare.

Leprosy.

Five hundred and ninety-one cases of leprosy received treatment during the year.

Enteric.

The comparative figures for patients treated at Government hospitals for the past four years are as follows :—

		Cases.		Deaths.
1929	...	107	...	25
1930	...	102	...	17
1931	...	118	...	22
1932	...	153	...	20

Of the cases reported during the year 31 occurred in Europeans, 11 in Asians and 111 in Africans.

Dysentery.

		Cases.		Deaths.
1931	...	1,233	...	34
1932	...	594	...	25

The classification of cases is as follows :—

Amoebic, 235 ; Bacillary, 52 ; Undefined, 307.

Diphtheria.

Fourteen cases occurred.

Cerebro-Spinal Fever.

Only twenty-three cases were treated during the year and no epidemic occurred.

Anthrax.

The total number of cases reported is 137.

Undulant Fever.

Only eight cases were reported as against fifty-two in 1930.

HELMINTHIC DISEASES.

Helminthic infection of one kind or another is as has been noted year after year almost universal among the native population, while a very large proportion of the population actually suffer from disease as a result. During the year a total of 30,250 cases were treated at Government hospitals and dispensaries for hookworm, roundworm, tapeworm, bilharzia or other less important worm infections, and an unknown number of cases were treated for roundworm and tapeworm infections at out-dispensaries. Of these treatments those given at hospitals and dispensaries were probably in a large number of cases effective, while of those given at out-dispensaries those for roundworm were probably fairly efficacious, while those given for tapeworm being carried out only by the exhibition of male ferm were probably of but little effect.

The position with regard to helminthic diseases is that with regard to no other disease of outstanding importance is the proportion of the actual sick treated annually so small. The reason for this state of affairs is not that treatment is unpopular but that in almost all cases effective treatment can only be secured by the exhibition of drugs which are too dangerous to be placed in the hands of out-dispensary dressers. Till, therefore, we have either a larger staff of qualified medical officers or less dangerous drugs the great majority of the population must remain untreated for helminthic infection.

Ankylostomiasis.

The total number of cases treated was 1,229.

Ascariasis.

The total number of cases treated was 6,950.

Taeniasis.

The total number of cases treated was 15,725.

Schistosomiasis.

The total number of cases treated was 252.

VITAL STATISTICS.

The non-native population of the colony was determined by census in March, 1931, when the following figures were obtained :—

European	17,285
Asians and Arabs	56,903

The African population is estimated at 3,007,645.

REGISTRATION OF BIRTHS AND DEATHS.

The position in connexion with the registration of births and deaths remains unsatisfactory. The existing legislation on the matter has not been put into effect as the necessary machinery has not been set up. The position is in fact so unsatisfactory that the medical officer of health of Mombasa records his inability to strike a death rate for the town. In other towns, however, where some information is obtainable from other sources, health officers have ventured on some analysis. The statistical material, however, is in all cases so unreliable or so limited that with the possible exception of Nairobi it is unsuitable for comparative purposes.

The death rates per 1,000 of the population for Nairobi as given in the medical officer of health's report are as follows :—

	1931	1932
Crude Death Rate (All Races)	16.21	13.51
Recorded Death Rate (All Races)	13.78	11.08
Recorded Death Rate (Europeans)	4.78	5.63
Recorded Death Rate (Asians)	14.31	13.57
Recorded Death Rate (Africans)	15.23	10.79

In Nairobi the recorded death rates for all races have shown a marked decrease during the past ten years due largely to a decrease in the African death rate. This is what one would have expected from the very considerable sanitary improvements which have been carried out during these years, but in the absence of comparative figures for the age constitution of the population and much other data it would be unwise and probably misleading to attempt to evaluate precisely the degree of improvement in the public health.

For the great African population in the native reserves no detailed figures are available other than those already given for the one district of Digo.

TABLE SHOWING THE SICK, INVALIDING AND DEATH RATES AMONGST EUROPEAN OFFICIALS IN THE COLONY AND PROTECTORATE OF KENYA

	1930	1931	1932
Total Number of Officials Resident	2,280	2,228	1,919
Average Number Resident..	1,717	1,647	1,497
Total Number on Sick List	1,462	1,206	1,013
Total Number of Days on Sick List	9,596	9,040	6,753
Average Daily Number on Sick List	26.29	24.76	18.45
Percentage of Sick to Average Number Resident ..	1.53	1.50	1.23
Average Number of Days on Sick List to each Patient..	6.56	7.49	6.63
Average sick time to each Resident	5.59	5.48	4.51
Total Number Invalided	10	15	6
Percentage of Invaliding to Total Residents .. ..	.44	.67	.31
Total Deaths	7	5	3
Percentage of Deaths to Total Residents.. .. ..	.31	.22	.15
Percentage of Deaths to Average Number Resident .. ..	.41	.30	.20
Number of Cases of Sickness contracted away from Residence	—	—	—

TABLE SHOWING THE SICK, INVALIDING AND DEATH RATES AMONGST NON-EUROPEAN OFFICIALS IN THE COLONY AND PROTECTORATE OF KENYA.

	1930	1931	1929
Total Number of Officials Resident	3,365	3,240	2,797
Average Number Resident..	2,882	2,706	2,314
Total Number on Sick List	5,022	3,711	2,249
Total Number of Days on Sick List	23,040	19,020	11,608
Average Daily Number on Sick List	76.82	52.27	31.71
Percentage of Sick to Average Number Resident ..	2.67	1.93	1.37
Average Number of Days on Sick List to each Patient ..	5.58	5.14	5.16
Average sick time to each Resident	9.73	7.05	5.01
Total Number Invalided	11	11	5
Percentage of Invaliding to Total Residents .. ..	.33	.34	.81
Total Deaths	18	7	5
Percentage of Deaths to Total Residents.. .. ..	.53	.21	.18
Percentage of Deaths to Average Number Resident .. ..	.62	.25	.22
Number of Cases of Sickness contracted away from Residence	—	—	—

III.—HYGIENE AND SANITATION.

A.—General Review of Work Done and Progress Made.

(1) PREVENTIVE MEASURES.

In the Annual Report for 1931 the general question of " preventive " measures, that is the measures necessary to secure any notable diminution of the incidence of disease among the general population, was discussed at some length and the essential measures were defined as " all those measures which are aimed at securing an improvement in the economic position and in the cultural standard of the average peasant ", and as of outstanding importance among these measures the following were noted :—

- " (a) measures directed towards altering the outlook of the peasant,
- (b) measures directed towards improving his methods of cultivation and of stock management,
- (c) measures directed towards the education of women with regard to the care and management of children and of the home, and
- (d) technical and literary education."

The list is incomplete and among the omissions are two which may with advantage be mentioned now since in the circumstances of financial restriction which at present prevail the degree to which these measures have so far been applied cannot but serve to emphasize the outstanding importance and the primary nature of the four groups of measures which were given pride of place in the report for 1931 and have now again been quoted.

The two additional preventive measures which must now be mentioned are :—

- (a) medical relief itself, and
- (b) propaganda directed towards the improvement of the culture of the people as regards personal hygiene and domestic environment.

These two measures are in fact the chief business of an executive medical department and the field for both is very wide. How wide it is and how small a part of the work we can at present undertake with our existing staff was clearly demonstrated in the chapter of this report dealing with the public health. In Kenya we have a native population of about 3,000,000. Half of these people at least are actually suffering from the effects of intestinal worms, half from scabies, probably more than half from malaria and many thousands from ulcers and yaws. *Each one of these cases so long as it goes uncured is a focus of infection.* Clearly medical relief if it could be provided on an adequate scale might play a great part as a preventive measure, but at the moment not more than one in every three of the population visits even a dispensary dresser once in a year, while the proportion seen by a qualified medical man can hardly be more than one in thirty, or about 3 per cent. At the present time therefore well over 90 per cent of three million people almost all of whom must be sick at one time or another during the year, and of whom at least 50 per cent or more are known to be sick throughout the year, are never seen by a qualified medical man. The figures for treatments given are undoubtedly large and satisfactory considering the smallness of the staff available, but they sink into insignificance in comparison with the numbers of folk left untreated, and treatment under these circumstances cannot, except in the cases of a few diseases, be a generally effective preventive measure. But unless treatment on an adequate scale can be made available disease will remain with us at a high rate of incidence till environmental and cultural conditions here have been even more radically improved than has been the case in Europe where, in spite of all the sanitary progress there has been, the proportion of practitioners required in the rural areas even to-day is, according to a recent report, one to two thousand of the population, or fifty to one hundred thousand. In Kenya we are fortunate if we can afford even one medical officer per hundred thousand of the population who in addition to being the medical practitioner for the population must carry out the functions of a health officer and a propagandist as well. By the standards of Europe therefore where the folk are less sick than here we should require to multiply our existing medical staff alone some fifty times if we are to provide efficient medical relief, and this apart altogether from the business of public health administration and sanitary propaganda. But at the present time it is a question not of multiplying staff but of whether Government can retain what small staff it has. And so a primary measure for the prevention of disease must be the improvement of the economic condition of the people, a measure which embraces each of the four measures mentioned at the beginning of this chapter.

I have dealt with this point at some length because of far greater importance in a report on public health activities than the mere record of work done is the estimation of the real progress achieved and the relation of that progress to the needs of the people. Without consideration of the point which has been made the detailed record of work which follows might be dangerously misleading for only the fringes of the problem of prevention are yet being touched. At the present moment when on every hand the question of the reduction of expenditure must be at least considered it is particularly incumbent on the health officer to make the last point clear to the utmost of his ability.

And in the matter of health propaganda and the improvement of environmental conditions the position is much the same as in the field of curative medicine, for though it is true that here many other agencies are at work besides the medical department still for that portion of the work which is

peculiarly the function of a medical department there are as yet available but half a dozen European sanitary inspectors, half a score of African health workers, and the spare time of the score of doctors who have in addition the burden of medical relief upon their shoulders.

With regard to the primary condition of progress in respect of the prevention of disease and more particularly of progress in the direction of improving domestic environment, namely, a fair measure of prosperity, the situation throughout the year was even less satisfactory than usual. Almost everywhere the financial depression has affected not only the European and Asiatic communities but the African as well, and in the great native reserves willing as many might be to build better houses, to improve water supplies, or to buy soap, shortage of funds has stood in the way; shortage of funds to the extent that in the case of many thousands of families the only cash payment made during the year, beyond a few transactions in cents, was made in respect of a hut tax of twelve shillings. In these circumstances, where on the part of the great bulk of the people there were hardly even pence to spare, any widespread improvement of domestic conditions was impossible. If one were to hazard an opinion it would be to the effect that while a few improvements were effected, on the whole there has been either stagnation or regression.

With regard to the progress that there has been in respect of the effective application of the four important groups of measures mentioned at the beginning of this chapter in so far as these measures are the direct concern of a medical department, it may probably be said that at least the outlook of the African peasant in Kenya is steadily widening. In the case of more thousands than we have the staff to deal with prejudice no longer stands directly in the way of medical and sanitary progress, though it may still stand in the way of measures essential to any notable progress in these directions, and to no small extent this widening of outlook has been the result of good hospitals and a high standard of clinical practice.

As regards the many measures directed towards the improvement of methods of cultivation and of stock management which have a most direct and intimate bearing on human health and sanitation it is a matter of very great pleasure and satisfaction to be able to record that during the year there has been as in previous years an increasing realization on the part of medical officers, agricultural officers and administrative officers of the verity of Sir Horace Plunket's dictum: "Better farming, better living, better business." As the years pass the work of the agricultural officers in the native reserves is ever more closely affecting the public health, either indirectly by promoting general prosperity, or directly by improving local food supplies and, for example, by ensuring that the dung of the cattle is used in the fields and so no longer serves to breed the hordes of flies which carry half the diseases of Africa. There is no medical officer in Kenya who does not welcome the advent of an agricultural officer in his district and our only regret is that where for the purposes of the public health alone a hundred such teachers are required, only about a dozen are available. Alone and unaided the medical officer of health of a rural district is almost helpless against the flies which can be controlled only by a major agricultural reform; alone he may order, but he can never ensure, a decent dietary.

As regards the education of the women in the care and management of children and of the home little progress can be reported. The usual routine work has been done but there have been no funds for the inauguration of the major measures which are required.

MOSQUITO AND INSECT-BORNE DISEASES.

Malaria.

No unusual incidence of malaria was recorded as occurring in the rural areas of the Colony during the year. In the goldfields area in North Kavirondo the possibility of a very high incidence among European miners as a result of residence in a malarious district, and of an increased incidence

among Africans as a result of altered surface conditions following on mining operations were a source of some anxiety. Among European miners the incidence of malaria though high was perhaps lower or less serious in its results than might have been expected if the disregard of personal precautions which, in spite of all warnings was almost universal, be taken into consideration. Fortunately also the disturbance of surface soil conditions such as the digging of innumerable trial trenches and interference with streams, though it has resulted in many places in a large increase in the numbers of anopheline mosquitoes has so far been without noticeable effect in increasing the incidence of malaria.

In the towns no outbreak of severity occurred except in Mombasa, where the number of cases was for a few months larger than usual. The institution of further measures of prevention in Mombasa may or may not be a simple one but an essential preliminary to any further action in that town is the institution of a mosquito and malaria survey extending over a considerable period as all obvious measures have now been taken and the reasons for the occasional outbreaks which still occur are obscure.

In the malarious areas of the great rural native reserves no general measures of prevention have yet been possible on a large scale. Nevertheless in one district, namely Digo where, as has been noted elsewhere, the disproportion between staff and population—there are two officers for 50,000 folk in Digo—is not so great as not to allow of intensive work on at least one or two sanitary problems, a most hopeful beginning has been made with regard to the institution of measures likely to result in the prevention of rural malaria at a later date. The line adopted has been the conservation of water supplies combined with the drainage and reclamation of small swamps by the efforts of the people themselves. For the moment the only results which can be claimed are the improvement of some water supplies and of the economic condition of a number of small farmers, and the abolition of a few anopheline breeding places, but the examples have been attractive and if the fashion spreads, as it well may if we can maintain the propaganda, the result in the long run coupled with the results of the improvement of housing which is taking place and other factors should be appreciable. The work so far done has been notable for its ingenuity and its simplicity. This is the first occasion on which in Kenya a systematic attempt has been made to deal with the prevention of malaria in a rural area in a native reserve by means of sanitary measures, for up to the present the task among people so poor and backward as those of Kenya seemed impossible. The methods which have been developed in Digo will soon, however, be instituted in many other districts for the basic principle is the conservation and economical use of water. In Kenya no proposition is so attractive as this and it is not improbable therefore that a first step towards the control of rural malaria has been taken.

Elsewhere in the Colony work has been confined to routine measures in and around administrative stations, and to the collection of data with regard both to the incidence and epidemiology of the disease and the distribution and bionomics of anopheline mosquitoes. With regard to both of these matters, however, work of great excellence is being done. In the large native reserve of Meru the medical officer has collected much very detailed information with regard to the incidence of the disease throughout the year, while throughout the country the medical entomologist, to whom for his indefatigable industry and keenness the greatest credit is due is gradually collecting information which should place every medical officer in a position to deal at least with certain localised areas if only they can find the time to spare and be provided with an African sanitary staff as well trained and responsible as the African hospital staff. As regards the control of malaria perhaps the most important matter at the present time is to provide the entomologist with additional subordinate European field staff. With such assistance he might soon be able to train an African staff which would provide both himself and the local medical officers of health with additional hands.

Trypanosomiasis.

Some effective work was done during the year by the Local Native Council of Central Kavirondo, which had provided funds for the clearing of watering places and engaged an European overseer for the purpose. Elsewhere prevention was confined largely to treatment. A notable event of the year was the allocation on the recommendation of the Colonial Development Fund Advisory Committee of a sum of £6,000 for an experiment in the control of tsetse fly by trapping. For various reasons, however, the experiment had not been inaugurated before the end of the year.

ENDEMIC DISEASES.**Plague.**

The incidence of plague throughout the year was very low and no unusual preventive measures were in operation.

Smallpox.

The Colony remained free from smallpox throughout the year. The total number of vaccinations performed was 12,118.

Dysentery.

No noticeable outbreaks of dysentery were recorded during the year, and no special preventive measures were called for.

The Enteric Fevers.

The enteric fevers were nowhere epidemic during the year and no unusual preventive measures were called for.

Tuberculosis.

No *ad hoc* preventive measures are in operation. The position with regard to the incidence of tuberculosis is obscure. Undoubtedly many of the sanitary circumstances of the people both in the towns and in the rural areas are such as might be expected to be favourable to the spread of tuberculosis, but these conditions are favourable to the spread of many other diseases than tuberculosis and are already the object of attention. The institution of measures specifically directed towards the control of tuberculosis alone if such are required is not for the moment practicable. Poverty and lack of culture stand in the way.

HELMINTHIC DISEASES.**Ankylostomiasis, Ascaris and Taenia.**

Preventive work against hookworm, roundworm and tapeworm has followed the usual lines of treatment and the provisions of pit latrines, and in the case of tapeworm meat inspection as well. In every reserve where the staff is available and where the people are sufficiently advanced, propaganda with regard to the institution of latrines is now a routine and during the year there has been steady progress.

Schistosomiasis.

In three reserves where infection with bilharzia is not uncommon, namely Digo, Central and South Kavirondo, a beginning has been made in a small way with preventive measures as in these reserves it has been possible to do some work with regard to the conservation of small water supplies and the sanitary measures taken for this purpose should in many cases be effective also in reducing the opportunities for infection with bilharzia.

(2) GENERAL MEASURES OF SANITATION.

No major schemes were embarked on in any of the towns during the year, but it may certainly be recorded that in every town as a result of the establishment of interested and responsible local authorities there has been a continuous improvement in tidiness, amenity and general sanitary conditions. The towns of to-day are much more pleasing places than they were a few years ago and ornamental gardens, tarred roads and improved side walks and lanes have done much not only for appearance but for health.

Sewage Disposal.

No new schemes of importance were inaugurated during the year.

Scavenging and Refuse Disposal.

In Nairobi a scheme for the mechanisation of the refuse removal service was prepared by the Municipal Council.

In one of the smaller townships in the native reserves an extremely interesting experiment was made in the disposal of refuse by converting it into compost. The experiment was exceedingly successful and if further experiments which are to be made elsewhere give equally satisfactory results the general institution of the method in suitable places will be for consideration.

Drainage.

No major works of importance were carried out in townships, though in most towns minor improvements were effected.

In the native reserves some useful and interesting work has been done by the sanitary inspectors in reclaiming small swamps with a view to improving both sanitary and agricultural conditions.

Water Supplies.

In Nairobi much consideration has been given by the Municipal Council to the question of finding a new and adequate source of supply.

In the native reserves, as has already been noted, the question of improving small water supplies for domestic purposes has received much attention and some ingenious methods have been devised by the European sanitary inspectors. It is not improbable that this matter will bulk very largely in the work of these officers in the future and that with experience we may find that very much more is possible at small expense than we had imagined. The matter is one of outstanding importance.

Sanitary Inspections.

In the townships with the exception of Mombasa, where there was a shortage of staff which was the cause of some anxiety, routine sanitary inspection was carried out as usual.

An outstanding feature of the year has, however, been the remarkable success which has attended the work of the European sanitary inspectors in the native reserves. The work of these officers is, however, much less that of an inspector than of a teacher, and in this respect their initiative has been notable. Wherever in the reserves one of these officers has been posted there has been at once a response on the part of the people, improved houses have been built, good grain stores erected and pit latrines dug. In one reserve brick burning has been established as an industry for the first time. Notable improvements have also been obtained at native markets and in the countless small native shops which are now springing up in all the native reserves. The most notable work which has been done, however, is that which has been already mentioned in connexion with the conservation of water and the improvement of water supplies. This work has not so far been great in extent but the first experiments have been made and very useful experience has been gained.

(3) SCHOOL HYGIENE.

Owing to the complete abolition of the posts of school medical officer and school nurses, no routine inspection of European and Asiatic schools and school children was possible during the year.

On the other hand much greater attention has been paid to the African schools in the native reserves whether Government schools or mission schools. Even so, however, the amount of time which medical officers can devote to these schools is very small in comparison with what is required. The schools are legion, they offer an unrivalled field for the practice of

hygiene and for treatment, and if each pupil could be cured of his or her minor or major complaints teaching could be far more economically and effectively performed. The provision of staff to allow of this most important work being undertaken on a larger scale so soon as it can be afforded is a matter of great public health and educational importance.

(4) LABOUR CONDITIONS.

Labour conditions both on estates, on the Railway and in the townships have remained much as during the previous year. Neither farmers nor the larger companies have had any funds at their disposal for major improvements. No serious outbreaks of disease occurred during the year among employed labourers.

(5) HOUSING AND TOWN PLANNING.

Housing.

The subject of housing was dealt with at some length in the report for 1931 when the position as regards all communities in all parts of the Colony was reviewed in considerable detail. At the end of 1932 the position is unaltered save for the progress made by individual natives in those reserves where European sanitary inspectors have been posted. Progress in these areas has however, as elsewhere, been hindered by depressed trade conditions. The value of the work done lies for the moment not in its amount but in the fact that in a number of reserves there are now standing, as the result of the initiative of some Africans who could afford to build, a considerable number of improved houses which will serve as examples and as an inspiration. There can be no doubt that as soon as prosperity returns housing will make great progress as the result of the work now being done.

Town Planning.

No schemes were inaugurated during the year.

(6) FOOD IN RELATION TO HEALTH AND DISEASE.

Inspection and Control.

Routine inspection was carried out as usual during the year.

Markets, Dairies and Slaughter Houses.

In the towns the only major work undertaken was the erection of a new, sanitary and up to date slaughter house in Nairobi.

In the native reserves much effective work was done in connexion with the improvement of sanitary conditions at native markets.

The Improvement of Food Supplies.

In the native reserves much useful work which in time will bear fruit was carried out by the agricultural officers. From the public health point of view the work of these officers is invaluable; for by no other means can local food supplies be improved, and the need for improvement is very great and of fundamental importance from the public health point of view. As a health measure in connexion with improvement of food supplies if for no other reason the appointment of an adequate agricultural staff to every native reserve is a primary measure essential to any notable progress. If such a staff could be made available, a great campaign for the sanitary conservation of manure initiated and a system of mixed farming popularised, whereby the cattle would be kept on the holding and a milk supply so made available for the children, a greater sanitary reform with the most far reaching results would be achieved and achieved in less time than by any multiplication of medical or sanitary staff, important and urgent as such multiplication may be, for ill nourishment is probably the most serious predisposing cause of disease with which we have to deal among the African population of the Colony.

B.—Measures Taken to Spread the Knowledge of Hygiene and Sanitation.

During the year no work was undertaken in the way of health exhibitions as no district shows were held either by the Administration or the Agricultural Department and none could be staged by the Medical Department alone as the provision for health propaganda was limited to a sum of £60.

Measures therefore were confined to the ordinary routine of exhortation and demonstration by the district staffs of medical officers, sanitary inspectors and African dressers. The total volume of such work is, however, great as after the provision of medical relief and in some areas with pride of place it is the chief work of the department. Particularly in the Digo and Teita district in the Coast Province and in the Keraguya area of the South Nyeri district of the Kikuyu Province this type of work received special attention. A feature of the year in these as in other districts has been the effectiveness of the African as a propagandist once he has been trained and his enthusiasm aroused.

No new literature was published during the year but a considerable amount of work was done towards the preparation of a comprehensive book on better living for the use and guidance of the many thousands of Africans who are now beginning to alter their ways of life and many of their domestic customs, and to live in houses built on an European model, but who have small notion and but little chance of obtaining information as to how these things can best be done.

C.—Training of Sanitary Personnel.

The systematic training of Africans to be dispensary health workers referred to in the last annual report was continued throughout the year at the Jeanes School and an additional class of ten was recruited. The first class of ten should come into the field in 1933.

D.—Recommendations for Future Work.

In the Annual Report for 1931 recommendations were made with regard to four matters as being of paramount importance with regard to the public health, namely the need for agricultural education, the need for improved facilities for the training of women, the need for good housing accommodation for Africans living under urban conditions, and the need for comprehensive "bonification" schemes for those areas where the physical conditions such as either lack or excess of water, lack of transport or the impoverishment of the soil, are the essential causes of backwardness in the people.

All of these matters are important from the public health point of view, but the first is of outstanding importance both directly and indirectly : directly because without agricultural instruction the food supplies of the common people cannot be improved; indirectly because without funds the great outstanding needs of the people for medical relief and for education in the business of living healthily cannot be supplied.

To make specific recommendations with regard to meeting these particularly outstanding medical needs in the near future would at the moment be useless, for the needs are in effect to increase the number of available hospital beds from 1,700 odd as at present to somewhere near the figure of 6,000 which there should be at the minimum if the recommendations of the recent European Conference on Rural Hygiene be applied to Africa where the incidence of sickness is many times higher than in Europe ; and to multiply existing staff many times with a view to providing both medical relief and instruction in hygiene, while at the moment the difficulty is to maintain the few institutions which we have and to retain the small staff which we still employ.

The extent of the unmet medical needs of the country may be mentioned, however, in order to emphasize the importance of maintaining the small provision which we have and because also out of the very greatness of the

need for a well qualified staff of doctors, nurses, midwives, health visitors and sanitary inspectors we are led to a most weighty reason in support of the only practical medical recommendation for future work which can be made at the present time, the recommendation which is the burthen of the first chapter of this report, that at all costs the present standard of medical work and service should be maintained unimpaired.

The reason is as follows, the needs of the African population for medical, maternity and nursing service are so great that these needs can never be met in any reasonable measure except by Africans, by African doctors, African midwives and African nurses; but if Africans are to render this service efficiently they must be trained in a service where the very highest standards of efficiency and of honesty of purpose prevail, and where at every point a high sense of responsibility can be inculcated. In the last ten years we have, taking all things into consideration, made a good beginning, and the most important recommendations which can be made at the present time with regard to future work are that its standard should never be less high than it is to-day, and that in the interests of economy in the near, as well as the more distant future, not less, but if possible more funds, should be devoted to the training of African staff and especially of an African female staff. Without the assistance of our African staff at its present standard the department could not carry on to-day, and without the help of an adequate staff of well trained, conscientious and responsible African nurses the African doctor of the future will be as helpless as his European colleagues in Africa were ten years ago.

IV.—PORT HEALTH WORK AND ADMINISTRATION.

The number of vessels which entered Kilindini or Mombasa Harbours during the past three years was as follows :—

		1930	1931	1932
Steamships		667	584	515
Dhows		1,341	1,500	1,506

Steamship Tonnage—1,684,696
Dhow Tonnage—25,002

Vessels Medically Inspected on Arrival	328
Dhows Medically Inspected on Arrival	157
Vessels Arriving in Port Infected or Suspected	Nil
Vessels placed under Quarantine Restrictions or Subjected to Special Sanitary Measures	Nil
Passengers Medically Examined under Special Small-pox Regulations	7,163
Passengers Detained under Observation	Nil
Passengers Landed Subject to Surveillance	52
Bills of Health Issued	674

POR T HEALTH STAFF.

The staff employed on port health duties was the same in number as in the previous year, viz. (a) senior health officer, employed part time as port health officer; (b) health officer, employed part time as assistant port health officer; (c) clerk; (d) two orderlies; (e) mosquito searcher; (f) rat catcher; (g) office boy.

No sanitary inspector was available for duty. The absence of an officer of this category would make it a matter of great difficulty to enforce any special sanitary measures which might be required in regard to infected vessels. Fortunately no such occasion occurred during the year under review. There is, however, no guarantee that an emergency will not arise at any moment.

EXAMINATION OF SHIPS ON ARRIVAL.

During the year important modifications were made in the procedure relating to the granting of pratique to incoming vessels.

Hitherto all ships, other than those plying solely between the ports of the Protectorate, were subject to medical inspection by the port health officer prior to receipt of pratique. On 1st July a system was introduced by which ships whose ports of departure and call are known to be free from infectious disease are granted pratique by the pilot at the time of their entering the harbour, provided the master and surgeon, when carried, sign a certificate of health. In such cases the formal health declaration is obtained after the berthing of the ship in the usual way, but the port health officer does not himself board the ship to carry out medical inspection unless such is necessary for special reasons.

Ships from, or calling at, infected ports, or ports the condition of which is unknown, are not admitted to pratique until boarded and examined by the port health officer.

Six months' experience has proved this system workable and efficacious; no difficulties other than those of a minor administrative nature have been encountered. Its adoption has saved much time and travelling without in any way impairing the efficiency of the health administration of the port.

During the latter half of the year it was found necessary to examine, in all cases, ships from India, the Persian Gulf and the Far East on account of the infected condition of ports in those parts of the world. Ships from Madagascar required examination on most occasions owing to the existence of plague at Tamatave, whilst those calling at the smaller Red Sea ports were invariably examined as these ports are not included in the epidemiological bulletin.

INTELLIGENCE.

The weekly epidemiological bulletin broadcasted by the League of Nations Eastern Bureau at Singapore was received regularly and no serious defects in transmission were experienced.

INFECTIOUS DISEASES IN VESSELS.

No vessel arrived in port having on board a case of any one of the "Convention" diseases, or other serious infectious disease, nor did such a case occur in a vessel while in harbour. Free pratique was therefore given in every case.

INFECTIOUS DISEASES IN THE PORT.

The Town and Port of Mombasa remained free from dangerous infectious disease and clean bills of health were issued throughout the year.

SPECIAL PREVENTIVE MEASURES AGAINST THE INTRODUCTION OF INFECTIOUS DISEASE.

Regulations in reference to the landing of passengers from India continued in force and were unchanged throughout the year.

All passengers from India for disembarkation at Mombasa were examined prior to landing whether or not they were in possession of recent certificates of vaccination. In almost all cases examinations showed evidence of recent scarification but the number of successful revaccinations was not great.

SANITARY CONDITION OF THE PORT.

The port area, wharves, sheds, etc., were maintained in a satisfactory sanitary condition throughout the year.

RAT DESTRUCTION.

Rats though present in the port area were not numerous. The condition in which the sheds and godowns are maintained is not such as to encourage undue multiplication.

Rats trapped	...	...	...	6,922
Rats examined	...	...	...	467

No evidence of plague infection was found in any of the rats examined.

MOSQUITO BREEDING.

The port area and small craft were searched constantly for mosquito breeding places. Mosquito breeding on a small scale was frequently discovered but at no time assumed serious proportions nor was any nuisance caused thereby.

IMPORTATION OF USED CLOTHING.

Consignments of used clothing were almost invariably accompanied by the disinfection certificate required by the Port Health Regulations.

One hundred and forty-seven consignments, comprising 132,741 articles, were passed, while three were stopped and re-exportation or destruction ordered.

INSPECTION OF IMPORTED FOODS.

Owing to the services of a sanitary inspector not being available no routine examination of imported food was undertaken.

V.—MATERNITY AND CHILD WELFARE.

Maternity and child welfare work was continued as usual during the year.

STAFF RETAINED BY GOVERNMENT.

Nairobi.—One woman medical officer and two health visitors.

Mombasa.—One woman medical officer and two health visitors.

Eldoret.—One health visitor.

		1932	1931
NAIROBI—			
Attendances ..	..	40,292	33,101
House Visits ..	..	3,646	7,555
MOMBASA—			
Attendances ..	..	30,388	11,284
Visits ..	..	12,750	11,166
ELDORET—			
Attendances ..	..	10,831	—
Visits ..	..	6,001	—

The work at all of these town centres made marked progress during the year and there is evidence that its educational value is steadily increasing. The most urgent need, however, with regard to child welfare work in the towns, is the need for compulsory education. At present only a small proportion of the children attend school while most are under but poor discipline and live in poor homes. Lack of discipline in the home, poor facilities for recreation, lack of knowledge how to play, little to do but play, an entire absence of those small occupations which under rural conditions can often be entrusted to children and an entire absence of the interests of the country make child welfare work in the towns a matter of the greatest difficulty. If compulsory education of a suitable type could be afforded and established progress would be immediate. At the moment the amount of health work which we can do and the amount of progress we can achieve in respect of individuals does not counterbalance the disadvantages which for the moment are inherent in urban life.

The maternity centres established in Nairobi and Mombasa by the Lady Grigg Welfare League continued to do excellent work.

In the native reserves a considerable amount of maternity and child welfare work was as usual carried out by the various missionary societies, while at Government hospitals there was an increasing demand for admissions of normal maternity cases.

In connexion with maternity and child welfare work there are at the present time two great outstanding needs, firstly a need for native midwives and native female nurses and secondly a need for a large number of special centres where some measure of education in the management of a home and a family could be provided for adolescent girls and young married women, and for a much larger number of ordinary schools for girls. It is of importance, however, to appreciate precisely how great these needs are. If the birth rate in the colony be, as it may well be if the Digo figures are at all general, say thirty per 1,000 of the population, then the total number of births in the colony yearly must be something like 90,000, or put in another way, on an average about 250 births must occur daily. Twice that number of midwives could not undertake the work which must ultimately be undertaken, but at present only a few dozen are available. Perhaps there is no need so urgent to-day as this need for midwives, and perhaps no medical measure which would have a more far reaching effect both socially and economically than the provision of an adequate supply. A small step towards the provision of that supply was taken by the establishment of the Lady Grigg African Maternity Centre at Nairobi, but that centre can never meet the need, for the material for training is inadequate, as Nairobi is too small. The solution of the problem will only lie in the provision of maternity wards at every native hospital in the colony and by means of such wards much could be done even at present, but to turn out really efficient midwives there must be a supply of fairly well educated women, while in order that midwives may be universally employed all women must be fairly well educated. At the moment the supply of educated women even for training is far from adequate.

VI.—HOSPITALS, DISPENSARIES AND VENEREAL CLINICS.

The numbers of patients treated at hospitals, dispensaries and out-dispensaries during the year are shown in the accompanying table. The Government medical institutions at which these patients were treated may be classified as follows :—

1. *Hospitals consisting for the most part of permanent buildings of good or fairly good design and affording a fair measure of convenience.*
2. *Hospitals consisting of temporary or semi-temporary or adapted buildings, affording in most cases but little convenience.*
3. (i) *Dispensaries and Out-patient Clinics* housed in or at hospitals, e.g. the dispensaries and clinics which are held at all urban hospitals and at all native reserve hospitals.
- (ii) *Dispensaries and Out-patient Clinics* held at various places in the towns other than hospitals.
- (iii) *Out-Dispensaries in the native reserves* which are supervised from and run in connexion with a hospital but are situated at distances of anything from ten to fifty miles or more from a hospital. Some of these dispensaries are housed in permanent buildings, others in temporary mud buildings.

All hospitals and hospital dispensaries and all urban dispensaries and clinics are under the direct charge of a medical officer or an assistant or sub-assistant surgeon. Almost all the permanent hospitals are under the direct charge of a medical officer.

All out-dispensaries in the native reserves are under the immediate charge of African dressers, though they are visited as frequently as possible by a medical officer who is responsible for their supervision and administration.

The numbers and detailed classifications of the various medical institutions and the numbers of beds at the end of 1932 were as follows :—

		Number	Beds
1. PERMANENT HOSPITALS—			
In Towns :			
European Hospitals	3	51	
African Hospitals	7	757	
In Native Reserves :			
African Hospitals	17	611	
2. TEMPORARY HOSPITALS—			
In Towns :			
African Hospitals	1	216	
In Native Reserves :			
African Hospitals	10	125	
3. (I) DISPENSARIES AND OUT-PATIENT CLINICS HELD IN OR AT HOSPITALS			
European	3	—	
African	37	—	
(II) DISPENSARIES AND OUT-PATIENT CLINICS HELD AT VARIOUS PLACES IN TOWNS OTHER THAN AT HOSPITALS—			
European	1	—	
African	17	—	
(III) OUT-DISPENSARIES IN NATIVE RESERVES—			
African	107	—	

THE STANDARD OF HOSPITAL AND DISPENSARY BUILDINGS, THE STANDARD OF HOSPITALISATION AND NURSING, AND THE STANDARD OF TREATMENT PROVIDED AT HOSPITALS AND DISPENSARIES.

Hospital Buildings.

Of the three European hospitals that at Kisumu is housed in a new, and for its purpose, a very convenient and adequate building, the hospital at Mombasa is very inadequate and exceedingly inconvenient, while the hospital at Nairobi though adequate in size, and in a good condition, is generally unsuitable and is without the convenience of a piped hot water supply and water closets.

Of the twenty-four African hospitals classified as permanent, all are in good condition, all offer a fair measure of convenience and most are pleasant places in which to work. Of these hospitals eighteen were built or almost entirely rebuilt and for all practical purposes brought into commission during the past twelve years, while of these eighteen, fourteen have been built since 1928. In almost all cases, however, the standard of convenience for patients, nurses and doctors which it had been intended to provide has not been obtained owing to the entire inadequacy of the buildings to meet the daily increasing demand for hospital treatment. Almost without exception the African hospitals are consistently overcrowded, and daily at almost all hospitals patients who ought to have hospital treatment are turned away, while others are discharged earlier in convalescence than is desirable in order to make room for more urgent cases.

IN- AND OUT-PATIENTS TREATED AT GOVERNMENT HOSPITALS,
DISPENSARIES AND OUT-DISPENSARIES IN 1932

Hospitals in Townships	In-patients	Out-patients
European Hospital, Nairobi	854	144
Native Hospital, Nairobi	3,736	1,800
Mathari Mental Hospital, Nairobi	167	—
Infectious Diseases Hospital, Nairobi	1,057	—
Prison, Nairobi	1,043	3,164
General Dispensary, Nairobi	—	25,302
Loco. Dispensary, Nairobi	—	7,629
Police Dispensary, Nairobi	—	994
Child Welfare Centre, Nairobi	—	23,316
Pumwani Clinic, Nairobi	—	1,275
District Health Office Clinic, Nairobi	—	1,278
European Hospital, Mombasa	216	682
Native Hospital, Mombasa	2,414	28,023
Infectious Diseases Hospital, Mombasa	430	1,175
Child Welfare Centre, Mombasa	—	19,377
European Hospital, Kisumu	203	316
Native Hospital, Kisumu	3,388	17,229
Prison, Kisumu	173	1,251
Native Hospital, Nakuru	1,460	4,660
Native Hospital, Eldoret	891	2,187
Railway Dispensary, Eldoret	—	1,791
Native Hospital, Kitale	942	4,504
TOTAL	16,974	146,097

HOSPITALS IN TURKANA AND NORTHERN FRONTIER PROVINCE
AND LAMU

	In-	Out-	Out-dis- pensaries
Lodwar	155	1,461	—
Lokitaung	97	1,151	—
Wajir	215	2,946	—
Moyale	134	1,947	—
Lamu	279	14,139	10,068
TOTAL	880	21,644	10,068

HOSPITALS IN NATIVE RESERVES

Wesu	516	5,380	8,825
Kabarnet	295	4,392	16,930
Kitui	667	8,996	32,183
Kapenguria	365	2,550	—
Narok	139	3,906	—
Malindi	135	7,407	—
Kakamega	1,616	17,298	124,447
Kilifi	121	2,882	12,410
Kericho	635	2,429	1,990
Machakos	1,339	8,002	49,712
Muriranas	217	9,207	—
Kisii	1,275	6,697	40,169
Nyeri	813	10,154	—
Fort Hall	1,604	11,776	59,429
Voi	309	2,670	—
Meru	978	13,601	38,324
Kiambu	1,285	6,899	17,150
Maseno	—	—	61,399
Kisumu	—	—	38,604
Msambweni, Digo	74	1,213	8,177
Kapsabet	457	25,376	15,167
Keraguya	530	12,209	65,803
Tambach	344	1,494	—
TOTAL	13,714	164,538	590,719

Apart from the question of overcrowding the standard of accommodation aimed at has been that represented by sixty square feet per bed in a well lit and well ventilated ward with a concrete floor, whitewashed concrete, or

brick walls, and a corrugated iron or tile roof without a ceiling. Pail latrines and a simple bathing place are attached to most wards and each hospital has a simple operating theatre, a few rooms used as an out-patient department, a pack store, a linen store, a general store, a kitchen, a simple laundry and a mortuary. Piped water supplies to the hospitals have been provided in some cases, hot water installations in none, while only two have so far been provided with that most important requisite for good nursing: electric lighting. Waterborne sewage systems have not yet been installed in any African hospital. Wooden forms and tables for the use of convalescents at meal times are beginning to be provided but they can be used only out of doors as in the interests of economy even the most recently built wards are too narrow to allow of their use indoors. All the permanent hospitals are in good repair, and in good sanitary condition. All without exception are very well kept, but none, far from being luxurious, provides more than a minimum of convenience, hardly one is adequate to the demands now made on it, and none as yet provide a degree of convenience compatible with the maximum economy of operation; for sweepers, to take only one example, cost more in wages annually than would be entailed by interest charges on the capital expenditure which waterborne sewage installations would have entailed. The advance which these hospitals represent in comparison with the conditions which pertained ten years ago can only be appreciated by those who may have seen the old hospitals; but the standard which has been achieved is not an ideal one, it is no more than the minimum with which a reasonable standard of nursing can be achieved.

Of the eleven temporary African hospitals the majority are small and are situated in outlying districts in which for various reasons it has been impracticable or unnecessary to establish larger institutions. There is, however, one notable exception, namely the African hospital at Nairobi, which though the largest medical institution in the colony and the seat of the medical training-depot for African hospital assistants still consists of very temporary wood and iron buildings. It is a relic of the war and has long served its time.

Dispensary Buildings.

At most hospitals and even at the most modern ones the buildings which can be devoted to dispensary work are entirely inadequate to the very large and remarkable demands which are now made for out-patient treatment. These demands were not entirely unforeseen, however, and the inadequacy of the buildings was largely the result of the impossibility of providing adequate funds. The most outstanding case of inadequate dispensary accommodation is that of the general dispensary at Nairobi.

Out-Dispensary Buildings.

With regard to the out-dispensaries in the native reserves there has in recent years been a very remarkable improvement. Ten years ago these dispensaries were without exception housed in wattle and daub huts of the poorest description. To-day out of 107 out-dispensaries no fewer than seventy-seven are accommodated in well built brick, stone, concrete or timber buildings to which are attached in many cases well built houses for the dressers, with pit latrines, demonstration grain stores, etc., etc. The funds for the erection of these well built dispensaries have in almost all cases been provided by the Local Native Councils concerned and not from central revenue. In most cases the staff and drugs are a charge on the Medical Department but in some cases all charges are met by the Local Native Councils.

Standard of Hospitalization.

To-day all African hospitals are well equipped as regards beds, bedding, furniture, instruments and drugs, while the standard of rationing and cooking is steadily improving.

Good blankets and good, if coarse, sheets and hospital clothing are supplied; towels are coming into use, and the laundry service is fairly adequate. The standard of cleanliness among patients has also improved.

With regard to the matters of equipment, dietaries and cleanliness, however, some reservations must be made, firstly hardly a hospital in the country can keep the number of its patients down to the number of its authorized beds, so that overcrowding of patients in *beds* is frequently unavoidable, and while at no hospital so far has it been necessary seriously to restrict dietaries, at no hospital has it been possible to afford an adequate water supply for ablution purposes.

The Standard of Nursing.

To twelve African hospitals, five of which are in towns and seven in the native reserves, European nursing sisters are posted. At the African hospital at Nairobi there are three sisters and elsewhere two, or one. The functions of these sisters are a combination of those of a matron, a house-keeper, a nursing sister and a tutor, and they have increased the efficiency of the African hospitals and of the African dressers out of all knowledge. Incidentally they have effected great economies where before there was on occasions at least great wastage, for to-day blankets are properly washed and cared for, hospital clothing is stitched in time, and rations without exception reach the patients for whom they are intended. These sisters have trained African youths in the technique of nursing and to a sense of responsibility and the African dresser, though he has still far to go before he becomes the perfect orderly, and perhaps before he reaches that stage we shall be training women, has nevertheless travelled far in recent years, and in the theatre especially many of them are excellent. In all hospitals some measure of night nursing is now the rule where before it was almost unknown.

Soon when all hospitals have received a leavening of hospital assistants from the medical training depot in Nairobi the standard of nursing should be as high as can be expected until the African woman comes into the field.

The Standard of Treatment provided at Hospitals and Dispensaries.

At Hospitals.

Apart from nursing there is the business of medical and surgical treatment to be considered.

In the hospitals the standard of medical and surgical treatment has been steadily rising during recent years. Factors facilitating this rise have been study leave for medical officers, better hospital buildings, better equipment and better nursing and very notably the great service rendered by the laboratory in providing almost every hospital with a trained African laboratory assistant capable of examining stools for evidence of helminthic infection, blood slides for malaria, and sputum for the tubercle bacillus. Direct laboratory service in making examinations of sera and other specimens has also played a part. Medical diagnosis and treatment still, however, leave room for great improvement and both our African laboratory assistants and our dressers must be much more skilled before as a routine every secretion and excretion is examined as it ought to be and every patient's history taken and recorded with the degree of accuracy which is necessary to diagnosis. Of particular importance is inspiration and guidance for the medical officer himself, and the provision of additional medical assistance. To-day the demands made on the medical officer of a large native reserve by public health work and by the administration of his hospital and the supervision of his out-dispensaries are very great and the amount of time for fine clinical work is correspondingly limited.

But it is on good clinical work and particularly on good clinical medicine that public health economy ultimately depends, and specialist physicians are therefore required. To this need the paucity of our information with regard to the way in which disease affects the African stands as evidence to-day and specialist physicians could help the administrator to effect great economies in many ways.

At Hospital Dispensaries for Out-patients.

At most hospital dispensaries the standard of diagnosis and treatment has made great advances in recent years for the reason that wherever it has been possible the old organization of a medical officer and a sub-assistant surgeon has been replaced by two medical officers and one or two European nursing sisters, or a medical officer and one or two sisters. Male out-patients are now therefore seen as a rule by a fully qualified medical officer instead of by a sub-assistant surgeon, while female out-patients are either all seen by a medical officer or they are seen first by a sister who may deal with the more simple cases herself. Two results have followed : firstly there has been a steady increase in the number of out-patients and particularly of female out-patients following on confidence, and secondly improved diagnosis has shown that "ordinary" in contradistinction to the so-called "tropical" diseases are as common in Africa as in Europe, and our hospitals as a result are beginning to be filled with cases other than ulcers. The demand for beds has resulted in research as to more expeditious ways of turning over the ulcer cases and so our hospital accommodation goes further while every day it becomes less equal to the increasing demands which are being made on it.

At Out-Dispensaries.

The typical medical organization of a great native reserve with a population of anything from 100,000 to 350,000 persons is that represented by a "secondary health centre" consisting of a central hospital and dispensary and staff, situated at the administrative headquarters of the district, and from six to a dozen or more "primary health centres" or out-dispensaries scattered throughout the reserve at distances of from ten to fifty miles from the central hospital. These out-dispensaries are housed as a rule in simple buildings consisting of one room and a verandah. These buildings have been erected in most cases by the Local Native Council. As a rule they are neat, whitewashed, concrete affairs, and for the moment they serve their purpose. The furniture is a table, a couple of chairs, a cupboard and some shelves. The equipment a jug, a basin and a pail, an intra-muscular syringe, a few dressing trays, scissors and forceps, a fair supply of dressings, and some simple drugs such as purgatives, quinine, sulphur ointment, metallic bismuth, santonin and cough mixture. The dispensaries are in charge of African dressers who have been trained at the district hospital. Sometimes there is a hut or shelter with a few beds. At many dispensaries there is a good house for the dresser and some model out-buildings, and in many cases the land surrounding the dispensary has been laid out as a demonstration plot with useful fruit trees and a vegetable garden by the agricultural officer of the district.

The business of the out-dispensary dresser is to dress ulcers and local injuries, to diagnose to the best of his ability the complaints of the people, to treat those which he can treat with the means at his disposal, and to transfer the seriously ill to hospital or to persuade them to come again on the day of the doctor's visit. He undoubtedly serves a useful purpose as a dresser of ulcers, sores and injuries, as a dispenser of quinine to sufferers from fever which in most cases is probably malaria, by giving intramuscular injections of bismuth to patients who in a majority of cases are suffering from either yaws or syphilis, by administering santonin to children who almost certainly suffer from roundworm infection, and *felix mas* to adults who if they complain of tapeworm infection are seldom wrong, by giving sulphur ointment to thousands who suffer from a disease which sulphur undoubtedly cures, by administering purgatives to the constipated and by transferring to hospital or by holding over for examination by the visiting medical officer those cases which he cannot diagnose.

There are 107 of these dispensaries in the colony and during the year there were treated at these some 646,033 persons, or over twice as many patients as were seen at all the central hospitals and dispensaries put together.

The small native reserve out-dispensary is, in fact, a type of medical institution of first class importance. At these dispensaries the bulk of our patients are seen and at these dispensaries in consequence more good or harm can be done than anywhere else. Their capacity for good is unlimited if they are properly administered and adequately supervised; inadequately supervised they are capable of much harm. The business of organizing out-dispensary work is therefore one of the chief functions of the Medical Department, and the business of supervising his dispensaries one of the chief functions of the district medical officer.

The standard of the out-dispensary dresser is still far from high and if left unsupervised for any length of time he may easily fall into careless habits, furthermore he cannot diagnose all complaints or treat all diseases, and as his clinical knowledge is limited he cannot be entrusted with dangerous drugs. Frequent visits from the medical officer are therefore necessary. If possible these visits should be made weekly as a routine and the medical officer should, if possible, spend the day at the dispensary dealing with the hundred or two hundred cases which may turn up to be seen by him. But the demands on a district medical officer's time are many, he may have a dozen out-dispensaries in his district, each situated a score of miles away from his hospital. Even where there are two medical officers in a district weekly visits are seldom possible, and where there is only one a monthly visit is often the most that can be achieved. At the present time therefore any considerable extension of the out-dispensary system is impossible.

The Development of the Out-Dispensary System.

The development and improvement of the out-dispensary system owing to the paucity of supervising medical staff is therefore our immediate object. To secure this improvement and development about ten Africans are being systematically trained each year at the Jeanes School as "dispensary welfare workers". These Africans were originally intended to replace the present dressers and to undertake health visiting as well as medical work and first aid, but the demands on the dispensaries for all kinds of assistance are becoming so great that it is unlikely that they will be able to replace the dressers, and so, soon we shall require to have both a dresser and a health visitor or "welfare worker" at each dispensary. Improvement of the medical side will therefore probably be slow, and notable progress in that direction will not be possible till systematically trained dressers or "hospital assistants" from the medical training depot are available for the out-dispensaries as well as for the hospitals.

The ultimate object is to post to each out-dispensary :—

- A well trained hospital assistant,
- A well trained welfare worker, and
- An African midwife.

At the same time a few beds should be provided at each dispensary and an adequate ambulance service established. When these things have been done the out-dispensary from having been little more than a poor dressing station as was the case only a few years ago will have developed into an effective "primary health centre" capable of playing a part not only in the cure but in the prevention of disease.

NATIVE HOSPITALS.

Considerable building activity occurred during the year and old and dilapidated buildings at Kabarnet, Narok and Nyeri were replaced by permanent structures of good design and material.

The establishment of beds at these new hospitals was as follows :—

(a) Kabarnet	...	...	...	...	...	20 beds
(b) Narok	...	...	...	...	...	14 ,,
(c) Nyeri	...	...	...	...	...	30 ,,

Two new hospitals were also erected in the Coastal area, viz. :—

(a) Kilifi	...	...	...	...	30 beds.
...	(b) Msambweni (Digo District)	...	...	30	,

A new hospital was also built in the Fort Hall district (Kikuyu Reserve) at Muriranjas, with accommodation for fourteen patients.

At the native hospital, Fort Hall, additions were carried out, and included :—

- (a) a small office for the medical officer,
- (b) a dispensary,
- (c) a temporary wood and iron structure to serve as a post-mortem room.
- (d) a wood and iron latrine.

At the native hospital, Kisumu, a labour room (maternity) was erected from Local Native Council funds. At the majority of the native hospitals minor repairs were carried out.

DISPENSARIES.

New and permanent dispensaries designed in accordance with the standard plans were erected at—

- (a) Baricho, Keraguya district.
- (b) Kianyagga , , ,
- (c) Runyenjis , , ,
- (d) Kombos , , ,
(a temporary structure)
- (e) Athi Meru district.
- (f) Kaongo , , ,
- (g) Kandara, Fort Hall district.
- (h) Gakarwe , , ,
- (i) South Teriki, Central Kavirondo (a sub-dispensary).

MEDICAL TRAINING DEPOT—NATIVE HOSPITAL, NAIROBI.

A scheme for training selected candidates for employment with the Medical Department was inaugurated during the latter part of 1929.

The motive underlying the scheme was to provide for the hospital service trained and disciplined natives well skilled in nursing and other hospital duties. A course of training was drawn up in order to secure that each student at the end of his training possessed a thorough knowledge of nursing duties, some knowledge of the recognition and treatment of common diseases and their complications, some knowledge of weights and measures, first aid, examination of urine, methods of obtaining specimens for the laboratory, technique of giving subcutaneous, intramuscular and intravenous injections and an elementary knowledge of poisonous drugs.

The course of instruction was originally fixed at a period of four years, but this has now been reduced to three, of which two-thirds of the time is spent in actual ward duties at the native hospital.

After a successful completion of the course, the student, now termed a hospital assistant, will be posted to a native hospital to take up a responsible position, being employed either in charge of wards or in the out-patient department, and he will be able to control and instruct other Africans placed under him.

During 1932 a total of thirty-nine students were in training and were being instructed in nursing duties, in dispensing, anaesthetics and theatre duties.

In addition to instruction by the medical officer in charge, European nursing sisters and a chief instructor (a seconded Royal Army Medical Corps Sergeant qualified in nursing and dispensing duties) they are from time to time given lectures by other officers of the department and are shown demonstrations by the laboratory staff.

They are also encouraged to visit places of educational interest, such as the Museum, Veterinary Training Department, Ngong, Medical Research Laboratory, etc. They have also been found useful as demonstrators at Public Health Exhibits.

Games are encouraged and the students provide a good football team.

A most interesting item of their training is the debating society which has been formed, organized debates on a variety of subjects take place usually on Monday evenings.

During the training the boys are fed, housed and paid by Government.

The scheme has, so far, been attended with complete success and well trained and disciplined hospital assistants are now about to take their place in the organization of the department.

A most important, far reaching and encouraging step in the interests of the Africans under training was the approval afforded during the year by the Secretary of State for the institution of a native assistant Medical Service modelled on the lines of the Arab and African clerical service already in being.

The establishment of such a service guaranteeing to the African certain definite conditions of service and rates of pay and ensuring security of tenure will not only stimulate the welfare and progress of the Medical Department but will undoubtedly have considerable influence in the propagation of public health work throughout this country.

EUROPEAN HOSPITALS, COMPARATIVE FIGURES.

Comparative figures of in-patients treated at Government European Hospitals during the last three years are as follows :—

			1930	1931	1932
Total	Number Treated ..	..	1,056	1,629	1,087
" "	Discharged ..	..	998	1,577	1,038
" "	of Deaths ..	..	28	27	21
" "	Remaining ..	..	30	25	28

NATIVE HOSPITALS, COMPARATIVE FIGURES.

The comparative table of admissions, etc., to Native Hospitals in the past three years is as follows :—

	In.	Out.	1930		1931		1932	
			In.	Out.	In.	Out.	In.	Out.
Patients	29,212	215,417	30,090	246,335	27,647	254,718		
Deaths	1,440	..	1,400	..	1,220	..		
Death-Rate per 1,000 admissions	49.3	..	46.5	..	44.12	..		

VENEREAL CLINICS.

Special clinics for the treatment of venereal disease in women were held weekly at Mombasa at each of five centres and at Nairobi at each of four centres. Men are dealt with at three clinics weekly at Nairobi and at one at Mombasa. On the whole there has been progress and increasing numbers of women are attending.

MEDICAL WORK CARRIED OUT BY MISSIONARY SOCIETIES.

The number of hospital beds maintained by the Missionary Societies receiving medical grants from Government, the numbers of patients and the amounts of the grants given are shown in the following table :—

Mission	Place	No. of beds	In- patients	Out- patients	Out- dispensary patients	Con- finements	Amount of grant
C.S.M. . .	Kikuyu . . .	80	897	3,442	—	77	£ 450
	Chogoria . . .	52	285	2,828	10,000	—	240
	Tumutumu . . .	87	1,428	11,375	14,017	246	1,050
C.M.S. . .	Kaloleni . . .	50	535	1,171	—	—	940
	Maseno . . .	58	814	9,432	—	73	420
S.D.A. . .	Kendu . . .	..	—	—	—	—	400

C.M.S.—Church of Scotland Mission.

C.M.S.—Church Missionary Society.

S.D.A.—Seventh Day Adventists.

At all the above mentioned hospitals a qualified medical practitioner and one or more European Nursing Sisters are maintained.

VII.—PRISONS AND ASYLUMS. PRISONS.

The prisons of the Colony generally speaking are well managed from the health point of view, and this is particularly the case with regard to the larger prisons to which European prison staff is posted. With the exception of a few prisons, however, all are overcrowded and many are grossly overcrowded, while in many cases the buildings are exceedingly unsuited for prison purposes. The position at the main prison of the Colony in Nairobi as regards buildings and accommodation is very far from satisfactory.

The general conditions in the prisons of the country remained unchanged during the year save that as will be seen from the table given below the daily average number of convicts in prison was larger, and overcrowding greater in consequence than in the preceding year.

The comparative figures for sickness and deaths in prisons for the past three years are given below :—

Year.	Daily Average in Prison.	Admissions to Hospital.	Daily Average on Sick List.	Percentage of Total Inmates.	Deaths.
1930	2,380	1,729	95	4·0	29
1931	2,508	1,612	90	3·6	56
1932	2,642	1,882	93	3·5	33

Of the total of 33 deaths pneumonia was responsible for 13, tuberculosis for 4, dysentery for 2 and other conditions 14.

Twenty-six cases of pulmonary tuberculosis were under treatment at the Nairobi Prison during the year.

Detailed figures of sickness and mortality for the three largest prisons are as follows :—

	Nairobi.			Mombasa.			Kisumu.		
	1930	1931	1932	1930	1931	1932	1930	1931	1932
Average Daily Number in Gaol	913	878.5	935	225	247.5	966	296	381	429.7
Average Daily Number on Sick List	57	55.6	60	9	4.6	7.4	3	5.19	7.1
Percentage of Average Daily Sick to Average Number in Gaol	6.2	6.3	6.4	3.8	1.8	2.8	1.0	1.5	1.7
Total Deaths (Excluding Executions)	18	16	8	3	7	7	1	18	9
Percentage of Deaths to Average Daily Number in Gaol	1.9	1.8	.8	1.3	2.4	2.6	0.3	4.7	2.1

MATHARI MENTAL HOSPITAL.

In the Annual Report for 1931 it was noted that a psychiatrist practising as a consultant in Nairobi had been appointed as Visiting Physician to the Mathari Mental Hospital and that the new appointment would be likely to lead to additions to our knowledge concerning the mental diseases which affect natives. That prophecy has proved to be correct and the Mathari Mental Hospital is now a hospital in fact as well as in name to the extent that diagnosis at least is carried out in a most satisfactory fashion. Unfortunately the business of treatment is still for the future but if the new buildings which have now been sanctioned should be erected during 1933 it should be possible in the Report for that year to remove the account of the operation of the institution from the section chiefly concerned with prisons to that which deals with hospitals. Even so, however, accommodation and general facilities will still be very far indeed from being entirely satisfactory. The improvement of the whole tone of the institution has, however, already been very marked and the standard of diagnosis has been raised out of recognition.

The total number of deaths in 1932 was 10 as against 38 in 1931.

The comparative table of admissions, discharges and deaths for the past three years is as follows :—

	ADMISSIONS	DISCHARGES			DEATHS				
		1930	1931	1932	1930	1931	1932	1930	1931	1932
Males	111	80	37	87	55	36	30	23	8
Females	33	23	6	24	19	9	4	15	2
TOTALS	144	103	43	111	74	55	34	38	10

The total number of patients treated during the year was 167 as against 236 in 1931 and the average daily number was 121 as against 148. This reduction in overcrowding was only achieved by refusing to admit patients unless in extreme emergency when the hospital was deemed to be full. Those patients who were not admitted were detained at various prisons. This arrangement can, however, only be considered as making the best of a bad job but the policy has been fully justified by results achieved at Mathari. The need for much more accommodation nevertheless remains as a very urgent matter.

The forms of mental disorder for which patients were admitted were classified as follows :—

Amentia and Epilepsy	...	...	...	1
Epileptics	...	...	...	1
Dementia Paralytica	...	...	...	1
Other mental diseases	...	...	...	40
			Total ...	43

One hundred and twelve patients remained at the end of the year as against 124 at the end of 1931.

European Section.

The total number treated during the year was twelve. The details are :—

		Males	Females
Remaining from 1931	...	5	3
Admissions, 1932	...	3	1
Discharges, 1932	...	4	1
Deaths, 1932	...	1	0
Remaining, 1932	...	3	3

Asiatic Section.

The total number treated during the year was eight. The figures are :—

	<i>Males</i>	<i>Females</i>
Remaining from 1931	...	4
Admissions, 1932	...	1
Discharges, 1932	...	3
Deaths, 1932	...	0
Remaining, 1932	...	2

Native Section.

The total number treated during the year was 147. The figures are :—

	<i>Males</i>	<i>Females</i>
Remaining from 1931	...	82
Admissions, 1932	...	33
Discharges, 1932	...	29
Deaths, 1932	...	7
Remaining, 1932	...	79

The following extracts from the Annual Report of the Visiting Physician indicate the type and amount of work which he has carried out :—

“(3) The physical health of the inmates has been considerably better than during 1930 and 1931.

Amongst the Europeans, Indians and Goans there was only a case of influenza (Indian) and a case of cardiac failure and death in a European admitted in a dying condition. This man had previously received malaria treatment for dementia paralytica in South Africa. Thirty-three male and six female natives were treated for physical illness in the sick rooms. The major illnesses of the males were malaria (5 cases) tuberculosis (3 cases), suspected tuberculosis (5 cases of which 2 remain under observation), pneumonia (2 cases), post-encephalitic syndrome (3 cases), septicaemia (2 cases), and general debility (4 cases). The female cases included three of tuberculosis, one remaining under treatment.

(4) Deaths.—The percentage of deaths to the total of patients during the year was 6 per cent; in 1930 it was 12 per cent, in 1931 16 per cent. The communicable diseases to which deaths were attributed were tuberculosis (3), pneumonia (2), septicaemia (1).

The mental affections of the 10 patients who died were :—

Dementia paralytica	...	...	...	2
Post-encephalitic syndrome	...	...	...	2
Senile psychosis	...	...	...	2
Amentia (simple)	...	...	...	2
Amentia (epileptic)	...	...	...	1
Amentia (syphilitic)	...	...	...	1
				—
Total	...	...	10	—

(5) Classification.—A beginning has been made but the process is unavoidably slow in present circumstances.

Europeans : (8 male and 4 female) :—

Male—

Dementia paralytica	...	...	...	2
Dementia praecox	...	...	...	1
Secondary dementia	...	...	...	2
Paranoid state	...	...	...	1
Alcoholic psychosis	...	...	...	1
Neurosyphilitic psychosis	...	...	...	1
				—
Total	...	...	8	—

Female—

Dementia praecox	...	...	...	1
Epileptic dementia	...	...	...	1
Manic depressive psychosis	...	...	...	1
Melancholia	...	...	...	1
			Total	4

Asiatics : (5 male and 3 female) :—*Male*—

Dementia praecox	...	...	...	3
Dementia paralytica	...	...	...	1
Paranoid state	...	...	...	1
			Total	5

Female—

Dementia praecox	...	...	...	2
Involutional psychosis	...	...	...	1
			Total	3

Native : (115 male, 32 female).

It was decided to complete classification of the males before undertaking that of the females, with the exception of cases in the sick-room considered to be dying. Two females were classified in this way as epileptic amentia and syphilitic amentia respectively. Thirty females therefore remain unclassified.

Male.—The first task was to separate the cases of amentia from those of psychosis. Four cases became too physically ill for complete examination for this purpose and died, but it was found justifiable on the available data to classify them as follows :—

Dementia paralytica	...	...	...	1
(Note.—A report of this case was published in the <i>E.A. Medical Journal</i> of December, 1932.)				
Amentia	...	...	...	1
Senile psychosis	...	...	...	2
			Total	4

Of the 111 remaining cases the separation of amentia from psychosis has not yet been effected in 9, leaving 102 in whom it has been effected. The result is :—

Amentia	...	...	...	...	...	48
Psychosis	...	...	...	...	...	54
					Total	102

The next task would be to classify the psychoses observed and to determine the psychosis suffered also by some of the aments. There appeared, however, to be a more urgent task for the time at the disposal of your Visiting Physician viz. to determine the presence of neurosyphilis amongst the males. This was begun early in the year with the kind co-operation of Dr. Cormack and Mr. Nefdt for the essential laboratory work. Owing to unforeseen delays the report on this subject is not yet ready.

Criminals : (24 male and 1 female).

Another necessary task undertaken was that of careful diagnosis and classification of the criminal cases which had been in the hospital for periods ranging on the 1st of January, 1932, from six-and-a-half years to three months.

Discharged or Died	Ref. No.	Sex	Diagnosis	Verdict	Offence
Died ..	A.0	M	Post encephalitic	1	Unnatural Offence.
Discharged ..	A.1	F	Puerperal psychosis, recovered ..	2	Child murder.
"	A.2	M	Temporary psychosis, recovered ..	2	Murder.
"	A.3	M	No amentia, no psychosis, found ..	2	Assault.
"	A.4	M	Temporary psychosis, recovered ..	2	Murder.
"	A.5	M	Temporary psychosis, recovered ..	1	Arson.
"	A.6	M	No amentia, no psychosis, found ..	3	Theft.
"	A.7	M	Neurosyphilis and temporary psychosis	3	Theft.
"	A.9	M	No amentia, no psychosis, found ..	2	Arson.
"	A.10	M	No amentia, no psychosis, found ..	2	Murder.
"	A.11	M	Neurosyphilis, under treatment ..	1	Murder.
"	A.12	M	Amentia	2	Murder.
Discharged ..	A.13	M	No amentia, no psychosis, found ..	3	Theft.
"	A.14	M	Amentia (high grade, moral) ..	3	Murder.
"	A.15	M	Amentia	1	Murder.
"	A.16	M	No amentia, no psychosis, found ..	2	Murder.
"	A.17	M	Manic depressive psychosis ..	1	Murder.
A.18	M				
A.19	M				
A.20	M		Deemed to be suffering from either amentia or psychosis requiring further examination for decision, but not yet fit for recommendation.		
A.21	M				
A.22	M				
A.23	M				
A.24	M				
A.25	M				

Norms.—Having established norms for Africans on the system introduced by Professor R. J. A. Berry, your Visiting Physician has been able to examine groups of inmates (criminals, aments, etc.) by the standards thus obtained. The results are of considerable scientific interest. These first norms for Africans have been obtained by research outside the hospital and should be of practical value to medicine and education. The research has been assisted by a grant from the Scientific Committee of the British Medical Association (London), and its results will be published in 1933.

Xerothalmia.—A few cases of this condition among the native inmates were discovered in October, 1932. A special report was sent to you on the 23rd January, 1933, containing also dermatological observations by Dr. Sequeira, who was kindly interested, and a bacteriological report by Dr. de Smidt.

Law.—Further experience of the law and its administration has confirmed the opinion that a completely new Mental Disorders Ordinance is urgently required and that a Mental Deficiency Ordinance is equally necessary.

European and Goanese discharges.—An effort has been made to transfer European and Goanese patients fit to travel to countries overseas where institutional treatment for their conditions was available. There is economic saving to the Colony in this. During the year 3 Europeans and 4 Goanese were so transferred.

Overcrowding.—The native quarters remain seriously overcrowded notwithstanding efforts to reduce this; the percentage is at present about 50 per cent over the maximum in the female block and about 33 per cent in the male block. This question cannot be considered apart from that of the necessity to separate refractory from quiet cases, aments (particularly juvenile) from psychotics, and criminals from all others."

VIII.—METEOROLOGY.

The statistics supplied by the Director of the British East African Meteorological Service are contained in Table IV appended to this Report.

A. R. PATERSON,
Director of Medical and Sanitary Services.

RETURNS.

TABLE I.

Administrative Division.

Dr. J. L. GILKS .. ..	..	Director of Medical and Sanitary Services.
,, A. D. J. B. WILLIAMS, O.B.E. ..	..	Deputy Director of Medical Service.
,, A. R. PATERSON .. ..	..	Deputy Director of Sanitary Service.
,, P. F. NUNAN .. ..	..	Senior Medical Officer.
,, F. J. C. JOHNSTONE .. ..	..	Senior Health Officer.
Mr. A. P. LING .. ..	..	Chief Sanitary Inspector.
(1) ,, H. OGDEN .. ..	..	Office Superintendent.
,, G. E. SCATTERGOOD ..	..	Accountant.
,, H. ELLIOTT, M.B.E. ..	..	Medical Storekeeper.
(2) ,, T. R. WILSON, .. ..	..	Clerk.
,, A. E. W. WEBB .. ..	..	.. "
,, R. L. O'SHEA .. ..	..	.. "
Mrs. E. L. FEAST .. ..	..	.. "
Mr. J. W. SHEARMAN .. ..	..	.. "
Miss M. E. CAMERON .. ..	..	.. "
,, M. A. CORFE .. ..	..	.. "
(3) ,, T. M. RAPER .. ..	..	.. "
,, J. M. C. MILLETT .. ..	..	.. "
,, K. L. GRANT .. ..	..	.. "
Mrs. G. E. FREISLICH .. ..	..	.. "
Miss E. C. GANNON .. ..	..	.. "
,, J. M. GILBERT .. ..	..	.. "

Medical Division.

(4)	Dr. N. P. JEWELL, O.B.E., M.C. ..	..	Resident Surgical Officer
	,, T. H. MASSEY, M.C. ..	..	Senior Medical Officer.
	,, V. M. FISHER .. ..	..	" " "
	,, C. B. B. REID .. ..	..	" " "
	,, J. H. NEILL .. ..	..	" " "
	,, R. C. BRISCOE .. ..	..	Medical Officer.
	,, C. V. BRAIMBRIDGE .. ..	..	" " "
(5)	,, K. T. K. WALLINGTON .. ..	..	" " "
	,, R. A. W. PROCTER, M.C. ..	..	" " "
	,, R. J. HARLEY-MASON .. ..	..	" " "
	,, J. C. J. CALLANAN .. ..	..	" " "
	,, C. H. BRENNAN .. ..	..	" " "
	,, P. MILNE .. ..	..	" " "
	,, E. W. C. JOBSON .. ..	..	" " "
	,, A. R. ESLER .. ..	..	" " "
	,, A. J. ENZER .. ..	..	" " "
	,, C. R. PHILIP .. ..	..	" " "
	,, W. WILKINSON .. ..	..	" " "
	,, J. R. DAVIES .. ..	..	" " "
	,, A. G. THOMSON .. ..	..	" " "
	,, J. A. CARMAN .. ..	..	" " "
	,, D. BELL .. ..	..	" " "
	,, J. H. H. CHATAWAY .. ..	..	" " "
	,, R. MCFIGGANS .. ..	..	" " "
	,, P. ROSS .. ..	..	" " "
	,, N. MCLEAN .. ..	..	" " "
	,, G. S. HALE .. ..	..	" " "
	,, A. T. HOWELL	" " "
	,, W. A. BULLEN	" " "
	,, E. A. TRIM	" " "
	,, T. F. ANDERSON	" " "
(6)	,, C. S. DAVIES	" " "
	,, G. D. DRURY	" " "
	,, P. G. PRESTON	" " "
	,, M. A. W. ROBERTS	" " "

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- (1) Appointment terminated, 31st January, 1932.
 (2) Retired, 30th October, 1932.
 (3) Resigned, 31st August, 1932.
 (4) Appointment terminated, 23rd January, 1932.
 (5) Transferred to Uganda on Promotion, 28th September, 1932.
 (6) Transferred to Northern Rhodesia, 14th March, 1932.

Medical Division.—*Contd.*

(1)	Dr. H. A. McMillan ..	..	..	Medical Officer
	„ J. C. D. CAROTHERS ..	..	..	„ „
	„ H. C. TROWELL ..	..	..	„ „
(2)	„ M. S. R. BROADBENT ..	..	..	„ „
	„ H. N. TURNER ..	..	..	„ „
	„ J. D. ROBERTSON ..	..	..	„ „
	„ R. M. DOWDESWELL ..	..	..	„ „
(3)	„ E. C. W. MAXWELL ..	..	..	„ „
	„ H. L. GORDON ..	..	..	Consulting Physician, Mathari.
	„ F. L. HENDERSON ..	..	..	District Surgeon.
	„ J. FORBES ..	..	..	„ „
	„ C. E. COWEN ..	..	..	„ „
	Mr H. L. SARGENT ..	..	..	Assistant Surgeon.
	„ W. N. SARGENT ..	..	..	„ „
(4)	„ L. LONG ..	..	..	Chief Instructor.
	„ W. C. A. SKEDGE ..	..	..	„ „
(5)	„ H. THEOBALD ..	..	..	„ „
	„ J. C. GOWER ..	..	..	„ „
	„ G. D. SHEEL ..	..	..	„ „
	„ F. G. VIE ..	..	..	Wardmaster
	„ T. JOHNSTON ..	..	..	Nursing Orderly
Miss	I. WILSON ..	..	..	Matron.
	„ M. I. RHIND ..	..	..	Nursing Sister.
	„ R. ANDERSON ..	..	..	„ „
	„ D. M. KENNY ..	..	..	„ „
	„ F. M. BIGGAR ..	..	..	„ „
	„ A. K. WILSON ..	..	..	„ „
	„ C. E. EASON ..	..	..	„ „
	„ E. M. BIRCH ..	..	..	„ „
	„ M. E. ROCHE ..	..	..	„ „
	„ S. I. BEAZLEY ..	..	..	„ „
	„ I. M. NICOLSON ..	..	..	„ „
	„ M. S. NEVILLE ..	..	..	„ „
	„ M. MCLEOD ..	..	..	„ „
	„ M. E. E. CLELLAND ..	..	..	„ „
	„ V. M. MORDAUNT ..	..	..	„ „
	„ R. M. HOOK ..	..	..	„ „
	„ H. M. COCHRANE ..	..	..	„ „
	„ M. D. KENNEDY ..	..	..	„ „
	„ M. A. MARSHALL ..	..	..	„ „
	„ A. M. THOM ..	..	..	„ „
	„ R. F. McLACHLAN ..	..	..	„ „
	„ G. A. DONEGAN ..	..	..	„ „
	„ M. V. TODRICK ..	..	..	„ „
(6)	„ D. V. GLANVILLE ..	..	..	„ „
	„ M. POWLES ..	..	..	„ „
(7)	„ R. WALPOLE ..	..	..	„ „
	„ R. M. REID ..	..	..	„ „
(8)	„ M. G. ALLEN ..	..	..	„ „
	„ J. SCOTT ..	..	..	„ „
(9)	„ E. McNAB ..	..	..	„ „
	„ G. M. WARRINGTON ..	..	..	„ „
	„ G. M. HENERY ..	..	..	„ „
	„ E. SEATON	„ „
	„ F. M. BABBAGE	„ „
	„ G. E. HAYES	„ „
	„ L. I. M. HOLMES	„ „
	„ K. R. JARDINE	„ „
	„ D. E. ROBINSON	„ „
	„ A. MACDONALD	„ „

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- (1) Appointment terminated, 30th June, 1932.
 (2) Appointment terminated 20th February, 1932.
 (3) Appointment terminated 20th February, 1932.
 (4) Returned to R.A.M.C. 14th November, 1932.
 (5) Returned to R.A.M.C. 5th December, 1932.
 (6) Resigned, 11th April, 1932.
 (7) Resigned, 12th May, 1932.
 (8) Resigned, 2nd July, 1932.
 (9) Resigned, 20th August, 1931.

Medical Division.—(Contd.)

Miss M. I. SMART	Nursing Sister
„ L. PEARSONS	„ „ „
„ E. M. MUNRO	„ „ „
„ E. E. WILLIS	„ „ „
Mr. W. G. HOWE	Superintendent, Mathari Mental Hospital
Mrs. A. T. HOWE	Matron, Mathari Mental Hospital.
Mr. S. J. BOSCH	Warder, Mathari Mental Hospital.
Mrs. M. A. BOSCH	Asst. Matron, Mathari Mental Hospital
Mr. F. M. SMURTHWAITE	Warder, Mathari Mental Hospital.

Sanitation Division.

Dr. R. N. HUNTER	Senior Health Officer.
„ P. C. C. GARNHAM	Health Officer.
„ K. A. T. MARTIN	„ „ „
„ P. P. D. CONNOLLY	„ „ „
„ R. F. G. DICKSON	„ „ „
„ G. M. HARGREAVES	„ „ „
„ M. MICHAEL SHAW (MRS.)	„ „ „
(1) Mr. J. P. COOK	Senior Sanitary Inspector.
„ A. BUNKER	„ „ „
„ D. P. BROAD	Sanitary Inspector.
„ R. C. MILLS	„ „ „
„ H. E. TAYLOR	„ „ „
„ F. HEWITT	„ „ „
„ H. O. SALT	„ „ „
„ H. MARTIN	„ „ „
„ H. H. RODGERS	„ „ „
„ C. A. LEWIS	„ „ „
„ F. FRANKS	„ „ „
„ R. D. PEARSON	„ „ „
„ F. C. GAFFNEY	„ „ „
„ H. JORDAN	„ „ „
„ J. S. STIRTON	„ „ „
Miss R. K. SHARP	Nursing Sister.
„ M. G. RICE-OXLEY	„ „ „
„ M. A. PERKIN	„ „ „
„ A. M. BURNS	„ „ „
(2) „ C. M. SUMMERFIELD	„ „ „
„ E. M. BUNCLE	„ „ „
Mr. W. J. HENFREY	Superintendent, Infectious Diseases Hospital

Laboratory Division.

Dr. W. H. KAUNTZE, M.B.E.	Deputy Director of Laboratory Services
„ R. P. CORMACK	Senior Bacteriologist.
„ F. P. G. DE SMIDT	Assistant Bacteriologist.
„ H. D. TONKING	„ „ „
„ F. W. VINT.. ..	„ „ „
Mr. M. H. FOX	Government Analyst.
Dr. D. HARVEY	Chemical Officer.
Mr. C. B. SYMES	Entomologist.
„ J. I. ROBERTS	„ „ „
„ F. A. BAILEY	Laboratory Superintendent
„ H. M. NEFDT	„ „ „ Assistant.
„ A. H. DAWS	„ „ „
„ J. McMAHON	„ „ „
„ W. L. TITMAN	„ „ „
„ W. A. DOUST	„ „ „
„ E. C. YOUNG	„ „ „
„ E. W. GRAINGER	„ „ (Learner Grade).
„ T. JONES	„ „ „
„ L. BURTON	„ „ „

(1) Died, 22nd July, 1932.

(2) Resigned, 19th July, 1932.

TABLE II.

Financial.

The sanctioned Medical Budget for the year 1932 was a total of £219,757 as compared with £253,699 for the preceding twelve months.

Of the 1932 grand total £197,653 was expended leaving an unexpended sum of £22,104.

The savings were due to retrenchments and curtailed activities owing to the financial situation.

The headings under which the vote was arranged were as follows :—

MEDICAL DEPARTMENT.			<i>Actual</i>
<i>Administrative Division.</i>	<i>Estimates</i>	<i>Expenditure</i>	
Personal Emoluments ...	£18,614	... £18,640	
<i>Medical Division.</i>			
Personal Emoluments ...	£84,824	... £80,759	
<i>Sanitation Division.</i>			
Personal Emoluments ...	£18,807	... £18,080	
<i>Laboratory Division.</i>			
Personal Emoluments ...	£14,607	... £14,625	
<i>Medical Department.</i>			
Other Charges ...	£82,505	... £65,156	
<i>Medical Department.</i>			
Extraordinary ...	£400	... £393	

REVENUE.

The total amount of revenue collected was as follows :—

Hospital fees ...	... ... ... ...	£6,733
Bills of health ...	... ... ... ...	582
Infectious Diseases Hospital, Fees, Nairobi Municipality ...	... ... ...	596
Infectious Diseases Hospital, Fees, Mombasa Municipality ...	... ... ...	116
Fees from Medical Research Laboratory	...	1,275
Fees from Government Analyst ...	...	116
Registration fees ...	...	60
Sale of medicines, etc. ...	...	1,370
		— £10,848
Re-imbursement from Uganda Govern- ment on account of Zanzibar Sanitary Station ...	... ... ... ...	425
Re-imbursement from Kenya and Uganda Railways and Harbours on account of Medical Services ...	... ...	6,110
Re-imbursement from Nairobi Municipality on account of Public Health Staff ...	... ... ... ...	872
Re-imbursement on account of messing expenses, European Hospital, Nairobi ...		493
		— 7,900
		— £18,748

Last year the total revenue collected amounted to £28,284.

TABLE III.
Statistics of Population for the Year 1932.

COLONY AND PROTECTORATE OF KENYA	Europeans and Whites	Africans and Others	Asiatics
Number of Inhabitants in 1931	*16,812	African: 2 966.993† Arabs and others 17 491*	39 644
Number of Births Registered in 1932	323	30	333
Number of Deaths Registered in 1932	120	221	303
Number of Immigrants during 1932	4 634	1,643	6 490
Number of Emigrants during 1932	4.439	1,784	9,180
Number of Inhabitants during 1932	No figures available beyond 1931 Census	3,007,645	No figures available beyond 1931 Census

* 1931 Census.

† Estimated at 31-12-1931.

TABLE IV.

Meteorological Returns for the Year 1932.

MONTH.	TEMPERATURE			RAINFALL		WINDS	
	Shade Max. Mean.	Max. and Min. mean combined.	Shade Minimum Mean.	Amount in Inches.	Degree of Humid- ity.	GEN. Dir. of Wind.	Average Force.
KABETE OBSERVATORY							
January	73.6	64.1	54.5	2.81	78%	NE	8
February	75.9	64.8	53.8	1.56	76	NE	2
March	73.3	65.6	56.8	8.80	87	NE by E	2
April	73.0	64.8	56.7	7.17	87	E by N	2
May	69.3	62.8	56.3	6.08	90	SE by S	2
June	68.7	61.2	53.6	1.04	90	SSE	1
July	67.5	59.5	51.6	0.83	89	SE by S	1
August	68.5	60.4	52.3	0.66	86	SE by S	2
September	73.0	63.8	54.5	0.44	86	ESE	2
October	74.8	65.1	55.4	1.56	83	ENE	2
November	73.0	64.8	56.7	2.47	87	ENE	3
December	70.7	65.1	55.4	5.81	34	ENE	3
YEAR AVERAGE ..	71.9	63.3	54.8	..	85	E by N	2.1
Yearly Total .. ..	..	..	..	49.05	..	..	..
KISUMU, MARINE DEPARTMENT							
January	85.9	74.7	65.6	1.31	52%	ESE	8.0
February	81.1	75.5	65.8	4.28	56	E by S	2.5
March	79.8	72.5	65.3	7.37	71	ESE	2.3
April	81.8	73.3	64.8	12.22	67	ESE	2.4
May	78.9	71.5	64.1	10.78	74	E by S	2.1
June	79.5	71.2	62.9	1.16	67	E by S	2.5
July	77.6	70.6	63.5	1.78	75	E by S	2.4
August	80.0	71.2	62.5	4.33	67	ESE	2.4
September	80.9	72.8	64.6	2.85	70	SE by E	2.1
October	82.9	73.5	64.1	1.17	58	E	2.2
November	82.8	73.5	64.2	0.97	60	SE by E	2.2
December	84.0	73.8	63.7	2.85	61	SE by E	2.5
YEAR AVERAGE ..	81.1	72.7	64.3	..	65	ESE	2.4
Yearly Total .. ..	..	..	..	51.05	..	..	..

METEOROLOGICAL RETURNS—Contd.

MONTH	TEMPERATURE			RAINFALL		WINDS	
	Shade Maxi. mean.	Max. and Min. mean combined.	Shade Minimum mean.	Amount in Inches.	Degree of Humidity	Gen. Dir. of Wind.	Average Force.
MOMBASA OBSERVATORY							
January	87.8	81.9	75.9	0.80	71%	NW	3.1
February	88.7	82.7	76.6	0.10	68	NW by N	2.2
March	90.3	84.2	78.1	2.43	71	NE	0.3
April	87.3	81.9	76.6	4.59	76	South	1.8
May	83.3	78.9	74.5	19.67	83	SW by S	1.5
June	82.8	77.9	72.9	5.25	80	S by W	3.0
July	81.7	76.7	71.8	2.15	79	SSW	3.3
August	82.0	77.0	72.0	4.89	90	S by W	3.4
September	83.1	78.0	63.0	5.48	79	S by W	2.7
October	85.8	80.3	74.7	0.54	72	SSW	2.7
November	88.2	82.2	76.3	2.20	72	South	1.5
December	89.4	82.5	75.6	4.80	73	North	0.7
Year Average ..	85.9	80.3	74.8		75	SSW	2.2
YEARLY TOTAL ..	..	..	..	52.95	..	..	..

TABLE SHOWING MEAN ANNUAL RAINFALL AT VARIOUS POINTS IN THE DIFFERENT AREAS FOR THE YEAR 1932.

COAST AREA.		MOUNTAINOUS AREA—(Contd.).	
STATION.	1932.	STATION	1932
Malindi ..	47.75 inches	Nakuru, D.C. ..	41.60 inches
Mombasa Observatory ..	52.95 "	Molo, Mt. Blackett Saw Mills ..	53.72 "
Mazeras, K.U.R. ..	29.66 "	Eldama Ravine, D.C. ..	54.07 "
Mackinnon Road, K.U.R. ..	55.16 "		
Voi D.C. ..	26.87 "		
Taveta, Col. Homer ..	29.32 "		
MOUNTAINOUS AREA.		NYANZA AND KENYA PROVINCE.	
Masongaleni, K.U.R. ..	31.12 inches	Lumbwa, Mtaragon ..	55.52 inches
Makindu, K.U.R. ..	24.59 "	Muhuroni, K.U.R. ..	61.31 "
Athi River, K.U.R. ..	22.21 "	Kisumu, Marine Department, K.U.R. ..	51.05 "
Kiu, K.U.R. ..	23.20 "	Mumias-Kakamega D.C. ..	77.95 "
Nairobi, Loreto Convent, 4th Railway Avenue ..	39.45 "	Kericho, D.C. ..	69.52 "
Kabete Reformatory, (Near Nairobi) ..	41.89 "	Nandi, D.C. Kapsabet ..	56.61 "
Naivasha, K.U.R. ..	24.13 "	Fort Hall, D.C. ..	56.52 "
		Nyeri, D.C. ..	43.39 "
		West Kenya, Karameno, (Naro Moru) ..	21.03 "

METEOROLOGICAL RETURN FOR THE YEAR 1932.

The observations in Nairobi were discontinued at the end of 1931, but a new station has been opened at the Convent for the year 1933. The temperature observations at Fort Hall have also been discontinued, rainfall only is observed.

RETURN OF DISEASES (In-Patients)

RETURN OF DISEASES—IN-PATIENTS—(Contd.).

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DISEASES	EUROPEAN OFFICIALS			EUROPEAN GENERAL POPULATION (Non-Official)			NON-EUROPEAN OFFICIALS (including ASIATICS)			NATIVE GENERAL POPULATION (including ASIATICS)		
	Total Admision	Total Deaths	Total Cases Treated	Total Admision	Total Deaths	Total Cases Treated	Total Admision	Total Deaths	Total Cases Treated	Total Admision	Total Deaths	Total Cases Treated
I.—EPIDEMIC, ENDEMIC AND INFECTIOUS DISEASES—(Contd.).												
17. Plague—												
(a) Bubonic	1	12	7	13	..	..
(b) Pneumonic	4	4	4	..	..
(c) Septicemic
(d) Undefined
18. Yellow Fever
19. Spirochaetosis ictero-haemorrhagi- cica	33	114	4	147	47
20. Leprosy
21. Erysipelas	2	..	..	8	1	8
22. Acute Poliomyelitis
23. Encephalitis Lethargica
24. Epidemic Cerebrospinal Fever
25. Other Epidemic Diseases—												
(a) Rubeola (German Measles)
(b) Varicella (Chicken-pox)
(c) Kala-azar
(d) Phlebotomus Fever
(e) Dengue
(f) Epidemic Dropsy
(g) Yaws
(h) Trypanosomiasis
26. Glanders	1	..	..	..	..	..
27. Anthrax
28. Rabies
29. Tetanus
30. Mycosis
31. Tuberculosis, Pulmonary and Laryngeal
32. Tuberculosis of the Meninges or Central Nervous System
33. Tuberculosis of the Intestines or Peritoneum

Cases remaining from previous year in Hospital at end of year

Cases remaining from previous year in Hospital at end of year

Cases remaining from previous year in Hospital at end of year

Cases remaining from previous year in Hospital at end of year

Cases remaining from previous year in Hospital at end of year

Cases remaining from previous year in Hospital at end of year

Remaining in Hospital at end of year

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RETURN OF DISEASES—IN-PATIENTS—(Contd.).

DISEASES	EUROPEAN OFFICIALS			EUROPEAN GENERAL POPULATION (NON-OFFICIAL)			NON-EUROPEAN OFFICIALS (including ASIATICS)			NATIVE GENERAL POPULATION (including ASIATICS)		
	Total Admision	Total Deaths	Total Cases Treated	Total Admision	Total Deaths	Total Cases Treated	Total Admision	Total Deaths	Total Cases Treated	Total Admision	Total Deaths	Total Cases Treated
II.—GENERAL DISEASES NOT MENTIONED ABOVE—(Contd.).												
45. Cancer or other Malignant Tumours of the Peritoneum Intestines, Rectum	1	..	1	..	..	..	2	8	2
46. Cancer or other Malignant Tumours of the Female Genital Organs	1	..	1	..	..	..	5	2	5
47. Cancer or other Malignant Tumours of the Breast	4	2	4	..	..	..	4	..	4
48. Cancer or other Malignant Tumours of the Skin	1	..	1	..	..	..	8	1	8
49. Cancer or other Malignant Tumours of Organs not specified	1	..	6	..	..	..	44	10	44
50. Tumours, Non-malignant	2	..	8	..	..	2	9	186	2
51. Acute Rheumatism	5	..	2	..	..	18	..	68	..
52. Chronic Rheumatism	11	..	4	..	..	58	..	240	..
53. Scurvy (including Barlow's Disease)	1	..	1	..	..	1	..	25	..
54. Pellagra
55. Beri-beri
56. Rickets
57. Diabetes (not including Insipidus)
58. Anaemia—
(a) Pernicious
(b) Other Anemias and Chlorosis
59. Diseases of the Pituitary Body
60. Diseases of the Thyroid Gland—
(a) Exophthalmic Goitre
(b) Other Diseases of the Thyroid Gland, Myxoedema
61. Diseases of the Para-thyroid Glands
62. Diseases of the Thymus

Cases remaining in Hospital at end of previous year

Cases remaining in Hospital at end of previous year

Cases remaining in Hospital at end of previous year

Cases remaining in Hospital at end of previous year

Cases remaining in Hospital at end of previous year

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Cases remaining in Hospital at end of previous year

Cases remaining in Hospital at end of previous year

Cases remaining in Hospital at end of previous year

RETURN OF DISEASES—IN-PATIENTS—(Contd.).

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DISEASES	EUROPEAN OFFICIALS (Non-Official)				EUROPEAN GENERAL POPULATION (Non-Official)				NON-EUROPEAN OFFICIALS (including Asiatics)				NATIVE GENERAL POPULATION (including Asiatics)			
	Total Admision	Total Deaths	Total Cases Treated	Remainding in Hospital at end of year	Cases remaining from previous year in Hospital at end of year	Total Admision	Total Deaths	Total Cases Treated	Remainding in Hospital at end of year	Cases remaining from previous year in Hospital at end of year	Total Admision	Total Deaths	Total Cases Treated	Remainding in Hospital at end of year	Cases remaining from previous year in Hospital at end of year	
III.—AFFECTIONS OF THE NERVOUS SYSTEM AND ORGANS OF THE SENSES—(Contd.).																
75. Paralysis—																
(a) Hemiplegia
(b) Other Paralyses
76. General Paralysis of the Insane
77. Other forms of Mental Alienation
78. Epilepsy
Concussion
79. Eclampsia Convulsions (non-puerperal) 5 years or over
80. Infantile Convulsions
81. Chorea
82. A.—Neuralgia
B.—Neuritis
C.—Neurasthenia
Neuralgia
Insomnia
83. Cerebral Softening
84. Other affections of the Nervous System, such as Paralysis Agitans
85. Affections of the Organs of Vision
(a) Conjunctivitis
(b) Trachoma
(c) Tumours of the Eye
Cataract
(d) Other affections of the Eye
86. Affections of the Ear or Mastoid
Sinus
Sciatica
Concussion
IV.—AFFECTIONS OF THE CIRCULATORY SYSTEM.																
87. Pericarditis
88. Acute Endocarditis or Myocarditis
89. Angina Pectoris

RETURN OF DISEASES—IN-PATIENTS—(Contd.)

DISEASES	EUROPEAN OFFICIALS				EUROPEAN GENERAL POPULATION (NON-OFFICIAL)				NON-EUROPEAN OFFICIALS (including ASIATICS)				NATIVE GENERAL POPULATION (including ASIATICS)				
	Total Admin- ision	Total Deaths	Total Cases Treated	Remain- ing in Hospital at end of year	Total Admin- ision	Total Deaths	Total Cases Treated	Remain- ing in Hospital at end of year	Total Admin- ision	Total Deaths	Total Cases Treated	Remain- ing in Hospital at end of year	Total Admin- ision	Total Deaths	Total Cases Treated	Remain- ing in Hospital at end of year	
VI.—DISEASES OF THE DIGESTIVE SYSTEM—(Contd.).																	
110. Affections of the Oesophagus—	..	6	..	..	..	7	..	2	..	13	..	..	..	..	..	..	..
A.—Ulcer of the Stomach	..	1	..	..	..	1	..	..	..	1	..	..	..	..	1	..	..
B.—Ulcer of the Duodenum
112. Other affections of the Stomach—																	
Gastritis	4	..	4	..	3	..	..	..	..	..	..	..
Dyspepsia	22	..	22	..	24	..	2	..	..	..	..	..
113. Diarrhoea and Enteritis—																	
Under two years
Two years and over
Colitis
Ulceration
Colic
114A. Sprue
115. Ankylostomiasis
116. Diseases due to Intestinal Para- sites
(a) Cestoda (Taenia)
(b) Trematoda (Flukes)
(c) Nematoda (other than Ankylostoma)
Ascaris
Trichicephalus dispar.
Trichina
Dracunculus
Strongylus
Oxyuris
(d) Coccidia
(e) Other Parasites
(f) Unclassified
117. Appendicitis
118. Hernia
A.—Affections of the Anus
Fistula, etc.

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RETURN OF DISEASES—IN-PATIENTS—(Contd.).

RETURN OF DISEASES—IN-PATIENTS—(Contd.).

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M E D

RETURN OF DISEASES—IN-PATIENTS—(Cont'd.).

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DISEASES	EUROPEAN OFFICIALS				EUROPEAN GENERAL POPULATION (NON-OFFICIAL)				NON-EUROPEAN OFFICIALS (including ASIATICS)				NATIVE GENERAL POPULATION (including ASIATICS)				
	Total Admin- istration	Total Deaths	Total Cases Treated	Total Deaths	Total Admin- istration	Total Deaths	Total Cases Treated	Total Admin- istration	Total Admin- istration	Total Deaths	Total Cases Treated	Total Admin- istration	Total Admin- istration	Total Deaths	Total Deaths	Total Cases Treated	
VIII.—PUERPERAL STATE.																	
143. <i>A.</i> —Normal Labour
<i>B.</i> —Accidents of Pregnancy—
(a) Abortion
(b) Ectopic Gestation
(c) Other accidents of Pregnancy
144. Puerperal Haemorrhage
145. Other accidents of Parturition
146. Puerperal Septicaemia
147. Phlegmasia Dolens
148. Puerperal Eclampsia
149. Sequelaæ of Labour
150. Puerperal affections of the Breast Caesarian Section
IX.—AFFECTIONS OF THE SKIN AND CELLULAR TISSUES.																	
151. Gangrene
152. Boil
Carbuncle
153. Abscess
Whitlow
Cellulitis
154. <i>A.</i> —Tinea
<i>B.</i> —Scabies
155. Other Diseases of the Skin—
Erythema
Urticaria
Eczema
Herpes
Dermatitis
Psoriasis
Elephantiasis
Myiasis
Chigoes
Cutaneous Leishmaniasis
Ulcers
Impetigo

RETURN OF DISEASES—IN-PATIENTS—(Contd.).

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RETURN OF DISEASES—IN-PATIENTS—(Contd.).

DISEASES	EUROPEAN OFFICIALS (NON-OFFICIAL)			NON-EUROPEAN OFFICIALS (including ASIATICS)			NATIVE GENERAL POPULATION (including ASIATICS)		
	Total Admis-sion	Total Deaths	Total Cases Treated	Total Admis-sion	Total Deaths	Total Cases Treated	Total Admis-sion	Total Deaths	Total Cases Treated
XIV.—AFFECTIONS PRODUCED BY EXTERNAL CAUSES.									
165. Suicide by Poisoning Attempted	1	..	1	..	..	..
166. Corrosive Poisoning (intentional)
167. Suicide by Gas Poisoning
168. Suicide by Hanging or Stran-gulation
169. Suicide by Drowning
170. Suicide by Firearms
171. Suicide by Cutting or Stabbing Instruments
172. Suicide by jumping from a height
173. Suicide by Crushing
174. Other Suicides
175. Food Poisoning
176. Attacks of Poisonous Animals Snake Bite
Insect Bite
177. Other Accidental Poisonings
178. Burns (by Fire)
179. Burns (other than by Fire)
180. Suffocation (Accidental)
181. Poisoning by Gas (Accidental)
182. Drowning (Accidental)
183. Wounds (by Firearms, War ex-cepted)
184. Wounds (by Cutting or Stabbing Instruments)
185. Wounds (by Fall)
186. Wounds (in Mines or Quarries)

DISEASES

Remaining in
Hospital at end
of yearCases remaining
in Hospital from
previous yearRemaining in
Hospital at end
of yearCases remaining
in Hospital from
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of yearCases remaining
in Hospital from
previous yearRemaining in
Hospital at end
of year

RETURN OF DISEASES—IN-PATIENTS—(*Contd.*).

RETURN OF DISEASES—IN-PATIENTS—(Contd.).

DISEASES	EUROPEAN OFFICIALS			EUROPEAN GENERAL POPULATION (NON-OFFICIAL)			Non-EUROPEAN OFFICIALS (including ASIATICS)			NATIVE GENERAL POPULATION (including ASIATICS)		
	Total Admin- istration	Total Deaths	Total Cases Treated	Total Admin- istration	Total Deaths	Total Cases Treated	Total Admin- istration	Total Deaths	Total Cases Treated	Total Admin- istration	Total Deaths	Total Cases Treated
XV.—ILL. DEFINED DISEASES.												
204. Sudden Death (cause unknown)
205. A.—Diseases not already specified or ill-defined	3	..	..	1	..	1	..	1	..
Ascites	49	1
Oedema	43	5
Asthenia	12	..	..	8	..	..	..	15	2
Shock	81	11
Hyperpyrexia	15	1
P.U.O.	21	..	..	63	..	..	..	169	1
Debility	8	..	..	2	..	..	..	462	15
N.Y.D.	1	..	..	1	..	..	..	5	35
Migraine	2	..	..	..	2	2
Marasmus	1	6
Torticollis	2	2
B.—Malingering	3	3
XVI.—DISEASES, THE TOTAL OF WHICH HAVE NOT CAUSED 10 DEATHS.												
GRAND TOTAL	..	13	1,005	2	1,018	19	27	1,330	23	1,357	25	30
SURGICAL OPERATIONS—												
Under General Anesthesia	76	..	..	..	..	287	..	..	..	2,860
Others	12	..	..	..	38	..	..	..	170

COLONY AND PROTECTORATE OF KENYA.

RETURN OF DISEASES (Out-Patients).

NUMBERS TREATED DURING THE YEAR 1932.

DISEASES	EUROPEAN OFFICIALS			EUROPEAN GENERAL POPULATION (NON-OFFICIAL)			NON-EUROPEAN OFFICIALS (including ASIATICS)			NATIVE GENERAL POPULATION (including ASIATICS)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
I.—EPIDEMIC, ENDEMIC AND INFECTIOUS DISEASES.												
1. Enteric Group—												
(a) Typhoid Fever	10	..	1	..	..	1
(b) Paratyphoid A.
(c) Paratyphoid B.
(d) Type not defined
2. Typhus
3. Relapsing Fever
4. Undulant Fever
5. Malaria—Clinical
(a) Tertian
(b) Quartan
(c) Aestivo-autumnal
(d) Undifferentiated
(e) Cachexia
(f) Blackwater
6. Smallpox
Alastrim
7. Measles
8. Scarlet Fever
9. Whooping Cough
0. Diphtheria
11. Influenza
12. Military Fever
13. Mumps
14. Cholera
15. Epidemic Diarrhoea
16. Dysentery—												
1 (a) Amoebic
(b) Bacillary
(c) Undefined or due to other causes	2
										9
										133	63	196

RETURN OF DISEASES—OUT-PATIENTS—(Contd.).

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DISEASES	EUROPEAN OFFICIALS			EUROPEAN GENERAL POPULATION (NON-OFFICIAL)			NON-EUROPEAN OFFICIALS (including Asiatics)			NATIVE GENERAL POPULATION (including Asiatics)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
17. Plague—							1	1	1	1	1	1
(a) Bubonic
(b) Pneumonic
(c) Septicæmic
(d) Undefined
18. Yellow Fever
19. Spirochætosis ictero-hæmorrhagiæ
20. Leprosy	1	1	1	..	..	..
21. Erysipelas	2	..	2
22. Acute Poliomyelitis
23. Encephalitis Lethargica
24. Epidemic Cerebro-spinal Fever
25. Other Epidemic Diseases—												
(a) Ruboëla (German Measles)
(b) Varicella (Chicken-pox)
(c) Kala-azar
(d) Phlebotomus Fever
(e) Dengue
(f) Epidemic Dropsy
(g) Yaws
(h) Trypanosomiasis
26. Glanders
27. Anthrax
28. Anti Rabic Treatment	1	1	1	..	..	..
29. Rabies
30. Tetanus
31. Mycosis
32. Tuberculosis, Pulmonary and Laryngeal
33. Tuberculosis of the Meninges or Central Nervous System
34. Tuberculosis of the Intestines or Peritoneum
35. Column
							1	3	4	..	..	..
							178	64	242	..	..	..
							2	2	2	..	..	2
							7	6	3	..	..	8
							6	3	9	..	..	9

RETURN OF DISEASES—OUT-PATIENTS—*Contd.*.

DISEASES	EUROPEAN OFFICIALS			EUROPEAN GENERAL POPULATION (NON-OFFICIAL)			NON-EUROPEAN OFFICIALS (including ASIATICS)			NATIVE GENERAL POPULATION (including ASIATICS)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
I.—EPIDEMIC, ENDEMIC AND INFECTIOUS DISEASES—<i>(Contd.)</i>.												
36. Tuberculosis of other Organs—												
(a) Skin or Subcutaneous Tissue (Lupus)	1	..	1	1	..	1	1	..	1
(b) Bones	7	..	7	17	..	17
(c) Lymphatic System
(d) Genito-urinary
(e) Other Organs
37. Tuberculosis disseminated—												
(a) Acute	2	..	2	..	1	1
(b) Chronic	2	4
38. Syphilis—												
(a) Primary	2	..	2	..	1	1
(b) Secondary	14	14
(c) Tertiary	4	4
(d) Hereditary
(e) Period not indicated
39. Soft Chancre
40. A.—Gonorrhœa and its complications
B.—Gonorrhœal Ophthalmia
C.—Gonorrhœal Arthritis
D.—Granuloma Venereum
41. Septicaemia
42. Other Infectious Diseases
Trypanosomiasis
II.—GENERAL DISEASES NOT MENTIONED ABOVE.												
43. Cancer or other Malignant Tumours of the Buccal Cavity
44. Cancer or other Malignant Tumours of the Stomach or Liver
45. Cancer or other Malignant Tumours of the Peritoneum Intestines, Rectum

RETURN OF DISEASES—OUT-PATIENTS—(Contd.).

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RETURN OF DISEASES—OUT-PATIENTS—(Contd.).

DISEASES	EUROPEAN OFFICIALS			EUROPEAN GENERAL POPULATION (NON-OFFICIAL)			Non-EUROPEAN OFFICIALS (including ASIATICS)			NATIVE GENERAL POPULATION (including ASIATICS)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
II.—GENERAL DISEASES NOT MENTIONED ABOVE—(Contd.).												
66. Alcoholism	1	..	1	..	..	1
67. Chronic poisoning by mineral substances (Lead, Mercury, etc.)	2	..	..	..	..	..	..	..	..
68. Chronic poisoning by organic substances (Morphia, Cocaine, etc.)	1	..	..	2	..	2	..	..	2
69. Other General Diseases—
Auto-intoxication
Purpura Haemorrhagica
Hæmophilia
Diabetes Insipidus
III.—AFFECTIONS OF THE NERVOUS SYSTEM AND ORGANS OF THE SENSES.												
70. Encephalitis (not including Encephalitis Lethargica)
71. Meningitis (not including Tuber-culous Meningitis or Cerebro-spinal Meningitis)
72. Locomotor Ataxia
73. Other affections of the Spinal Cord
74. Apoplexy—
(a) Hæmorrhage
(b) Embolism
(c) Thrombosis
75. Paralysis—
(a) Hemiplegia
(b) Other Paryses
76. General Paralysis of the Insane
77. Other forms of Mental Alienation	2	..	..	..	..	..	..	..	..
78. Epilepsy
79. Eclampsia Convulsions (non-puerperal) 5 years or over
80. Infantile Convulsions
81. Chorea
Insomnia
							2	..	2
							1	..	1

RETURN OF DISEASES—OUT-PATIENTS—(Contd.).

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DISEASES	EUROPEAN OFFICIALS			EUROPEAN GENERAL POPULATION (NON-OFFICIAL)			Non-European Officials (including Asiatics)			NATIVE GENERAL POPULATION (including Asiatics)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
III.—AFFECTIONS OF THE NERVOUS SYSTEM AND ORGANS OF THE SENSES.—(Contd.)												
82. <i>A.</i> —Hysteria	1	1	1	2	..	..	..	12	29	41
<i>B.</i> —Neuritis	1	1	1	2	1	1	1	191	77	268
<i>C.</i> —Neurasthenia...	3	4	1	2	1	1	1	12	5	17
Neuralgia	15	15	15	10	2	8	..	60	1,696	242
83. Cerebral Softening	1,938
Concussion	1
84. Other affections of the Nervous System, such as Paralysis Agitans	1	..	1	14	3	17
85. Affections of the Organs of Vision	143	5,029	8,040
(a) Conjunctivitis	17	17	6	4	10	143	..	18	97	45
(b) Trachoma	4	15	21
(c) Tumours of the Eye	2	2	..	..	..	..	..	..	6	12
Cataract	6	853
(d) Other affections of the Eye	18	19	1	7	5	12	..	58	688	165
86. Affections of the Ear or Mastoid Sinus	23	..	..	..	43	38	27	65	117	2,900
Sciatica	10	11	3,943
IV.—AFFECTIONS OF THE CIRCULATORY SYSTEM.												
87. Pericarditis
88. Acute Endocarditis or Myocarditis	3	..	..
89. Angina Pectoris
90. Other Diseases of the Heart—
(a) Valvular—
Mitral
Aortic
Tricuspid
Pulmonary
(b) Myocarditis
(c) Tachycardia
91. Diseases of the Arteries—
(a) Aneurism
(b) Arterio-sclerosis
(c) Other Diseases
92. Embolism or Thrombosis (non-cerebral)

RETURN OF DISEASES—OUT-PATIENTS—(Contd.).

DISEASES	EUROPEAN OFFICIALS			EUROPEAN GENERAL POPULATION (Non-official)			NON-EUROPEAN OFFICIALS (including Asiatics)			NATIVE GENERAL POPULATION (including Asiatics)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
IV.—AFFECTIONS OF THE CIRCULATORY SYSTEM—(Contd.).												
93. Diseases to the Veins—												
Haemorrhoids	5	..	..	..	5	..	..	..	..	16	97
Varicose Veins	1	..	..	..	1	..	..	..	..	5	5
Phlebitis	1	3
94. Diseases of the Lymphatic System—												
Lymphangitis
Lymphadenitis, Bubo (non-specific)	1	..	..	..	1	..	..	..	..	..	..
Adenitis	1	..	..	..	1	..	..	..	..	..	..
95. Haemorrhage of undetermined cause
96. Other affections of the Circulatory System	2	..	2	..	..	..	..	..	..
V.—AFFECTIONS OF THE RESPIRATORY SYSTEM.												
97. Diseases of the Nasal Passages—												
Adenoids
Polypus
Rhinitis
Coryza
Epistaxis
Laryngitis
98. Affections of the Larynx—												
Laryngitis
99. Bronchitis—												
(a) Acute	29	..	8	37	..	..	..	..	..
(b) Chronic
100. Broncho-pneumonia
101. Pneumonia—												
(a) Lobar
(b) Unclassified
102. Pleurisy, Empyema
103. Congestion of the Lungs
104. Gangrene of the Lungs
105. Asthma
106. Pulmonary Emphysema
107. Other affections of the Lungs
Pulmonary Spirochaetosis
Pleurodynna

RETURN OF DISEASES—OUT-PATIENTS—(Contd.)

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RETURN OF DISEASES—OUT-PATIENTS—(Contd.).

DISEASES	EUROPEAN OFFICIALS			EUROPEAN GENERAL POPULATION (NON-OFFICIAL)			NON-EUROPEAN OFFICIALS (including ASIATICS)			NATIVE GENERAL POPULATION (including ASIATICS)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
VI.—DISEASES OF THE DIGESTIVE SYSTEM—(Contd.).												
117. Appendicitis	5	..	5	1	1	2	2	..	3
118. Hernia	1	1	3	81	..	84
119. A.—Affections of the Anus	1	..	1	..	..	2	4	..	6
Fistula, etc.	10
B.—Other affections of the Intestines—	1	10	..	10
Enteroprosis
Constipation..	5	..	5	..	..	..	..	..	..
120. Acute Yellow Atrophy of the Liver
121. Hydatid of the Liver
122. Cirrhosis of the Liver—
(a) Alcoholic
(b) Other forms
123. Biliary Calculus
124. Other affections of the Liver—
Abscess
Hepatitis	2	..	2	..	..	..	..	..	..
Cholecystitis	1	..	1	..	..	..	..	..	..
Jaundice
125. Diseases of the Pancreas
126. Peritonitis (of unknown cause)
127. Other affections of the Digestive System	3	..	3	..	..	..	..	..	..
							1	1	4	5	3	..
										187	45	232
VII.—DISEASES OF THE GENITO-URINARY SYSTEM (NON-VENEREAL).												
128. Acute Nephritis
129. Chronic Nephritis
Haematuria
130. A.—Chyluria
Oxalyuria
B.—Schistosomiasis
131. Other affections of the Kidneys—
Pyelitis
132. Urinary Calculus
133. Diseases of the Bladder—
Cystitis
				1	2	2	..	..	..	..	..	..
							1	1	2	..	..	..
									1	1	1	..
									2	1	1	..
									1	1	1	..
									1	1	1	..
									2	1	1	..
									1	1	1	..
									4	6	6	..
									20	..
									59	..
										83

RETURN OF DISEASES—OUT-PATIENTS—(Contd.).

M E D

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RETURN OF DISEASES—OUT-PATIENTS—(Contd.).

DISEASES	EUROPEAN OFFICIALS			EUROPEAN GENERAL POPULATION (NON-OFFICIAL)			NON-EUROPEAN OFFICIALS (including Asiatics)			NATIVE GENERAL POPULATION (including Asiatics)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
VIII.—PUERPERAL STATE—(Contd.).												
144. Puerperal Haemorrhage	7	7	7
145. Other accidents of Parturition	7	7	7
146. Puerperal Septicæmia	7	7	7
147. Phlegmasia Dolens
148. Puerperal Eclampsia
149. Sequelæ of Labour	34	34	34
150. Puerperal affections of the Breast	1	1	1
IX.—AFFECTIONS OF THE SKIN AND CELLULAR TISSUES.												
151. Gangrene Traumatic	1	1	1	2	2	2
152. Boil	6	6	6	101	101	101
Carbuncle	1	1	1	13	13	13
153. Abscess	11	10	10	45	45	45
Whitlow	5	4	4	12	12	12
Cellulitis	4	4	4	8	8	8
154. A.—Tinea	4	4	4	5	5	5
B.—Scabies	3	3	3	48	48	48
155. Other Diseases of the Skin—												
Erythema	1	1	1	33	33	33
Urticaria	4	4	4	47	47	47
Eczema	2	2	2	63	63	63
Herpes	2	2	2	230	230	230
Psoriasis	20	7	7	51	51	51
Elephantiasis	4	2	2	17	17	17
Myiasis	2	6	6	22	22	22
Chigoes	1	1	1	43	43	43
Cutaneous Leishmaniasis	5	5	5	198	198	198
Acne	1	1	1	68	68	68
Dermatitis	2	2	2	703	703	703
Ulcers	10	10	10	171	171	171
Impetigo	1	1	1	1,443	1,443	1,443

RETURN OF DISEASES—OUT-PATIENTS—(Contd.).

M E D

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RETURN OF DISEASES—OUT-PATIENTS—(Contd.).

DISEASES	EUROPEAN OFFICIALS			EUROPEAN GENERAL POPULATION (NON-OFFICIAL)			NON-EUROPEAN OFFICIALS (including ASIATICS)			NATIVE GENERAL POPULATION (including ASIATICS)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
XIV.—AFFECTIONS PRODUCED BY EXTERNAL CAUSES.												
165. Suicide by Poisoning
166. Corrosive Poisoning (intentional)
167. Suicide by Gas Poisoning
168. Suicide by Hanging or Strangulation
169. Suicide by Drowning
170. Suicide by Firearms
171. Suicide by Cutting or Stabbing
172. Instruments
173. Suicide by jumping from a height
174. Suicide by Crushing
175. Other Suicides
176. Food Poisoning—												
Botulism
Attacks of Poisonous Animals—												
Snake Bite
Insect Bite
177. Attacks of Poisonous Animals—												
Other Accidental Poisonings
178. Burns (by Fire)
179. Burns (other than by Fire)
180. Suffocation (Accidental)
181. Poisoning by Gas (Accidental)
182. Drowning (Accidental)
183. Wounds (by Firearms, War excepted)
184. Wounds (by Cutting or Stabbing Instruments)
185. Wounds (by Fall)
186. Wounds (in Mines or Quarries)
187. Wounds (by Machinery)
188. Wounds (Crushing, e.g., Railway Accidents, etc.)
189. Injuries inflicted by Animals, Bites, Kicks, etc.
	11	..	1	1	1	1	2	237	408	89	497	..

RETURN OF DISEASES—OUT-PATIENTS—(Contd.).

M E D

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DISEASES	EUROPEAN OFFICIALS			EUROPEAN GENERAL POPULATION (NON-OFFICIAL)			NON-EUROPEAN OFFICIALS (including Asiatics)			NATIVE GENERAL POPULATION (including Asiatics)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
XIV.—AFFECTIONS PRODUCED BY EXTERNAL CAUSES—(Contd.).												
1190. Wounds inflicted on Active Service
1191. Executions of Civilians by Believers
1192. A.—Over Fatigue
R.—Hunger or Thirst
1193. Exposure to Cold, Frostbite, etc.
1194. Exposure to Heat—
Heatstroke
Sunstroke
1195. Lightning Stroke..
1196. Electric Shock
1197. Murder by Firearms
1198. Murder by Cutting or Stabbing Instruments
1199. Murder by other means
1200. Infanticide (Murder of an Infant under one year)
201. A.—Dislocation	10	..	10	..	2	2	..	..	..
B.—Sprain	3	3	..	..	..
C.—Fracture	1	1	..	..	..
202. Other External Injuries	76	..	76	..	77	77	..	..	..
203. Deaths by Violence of unknown cause
XV.—III.I. DEFINED DISEASES.												
204. Sudden Death (cause unknown)
205. A.—Diseases not already specified or ill-defined—
Ascites	1	1	..	..	..
Oedema	3	3	..	..	..
Asthenia	12	12	..	..	..
Shock	8	8	..	..	..
Hyperpyrexia	1	1	..	..	..
Suppuration Antrum	1	1	..	..	..
Debility	14	15	..	..	..
P.U.O.	4	4	..	..	..
Air Sickness	11	11	..	..	..
Torticollis	3	3	..	..	..
N.Y.D.	10	10	..	..	..
Migraine	7	7	..	..	..
B.—Malingering	33	33	..	..	..

RETURN OF DISEASES—OUT-PATIENTS—(Contd.).

DISEASES	EUROPEAN OFFICIALS			EUROPEAN GENERAL POPULATION (NON-OFFICIAL)			NON-EUROPEAN OFFICIALS (including Asiatics)			NATIVE GENERAL POPULATION (including Asiatics)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
XVI.—DISEASES, THE TOTAL OF WHICH HAVE NOT CAUSED 10 DEATHS.	..	..	..	..	..	..	..	..	..	..	..	..
GRAND TOTAL	603	43	646	552	397	949	7,077	..	7,077	190,919	68,799	254,718
SURGICAL OPERATIONS—												
Under General Anæsthesia	..	..	..	..	..	..	1	3	4	..	..	..
Others	..	..	..	3	..	3	2	9	11	56	..	56
										536	154	690
										23	86	

MEDICAL RESEARCH LABORATORY ANNUAL REPORT, 1932

By

W. H. KAUNTZE, M.D., D.H.P.

Deputy Director of Laboratory Services

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**ANNUAL REPORT OF THE MEDICAL RESEARCH
LABORATORY, KENYA COLONY AND
PROTECTORATE, FOR 1932.**

STAFF, 1932.

DEPUTY DIRECTOR OF LABORATORY SERVICES :

W. H. Kauntze.

SENIOR BACTERIOLOGIST :

R. P. Cormack.

ASSISTANT BACTERIOLOGISTS :

F. P. G. de Smidt.

H. D. Tonking.

F. W. Vint.

MALARIA RESEARCH OFFICER :

P. C. C. Garnham (seconded from Medical Division till 1st June, 1932).

GOVERNMENT ANALYST :

M. H. Fox.

BIOCHEMIST :

D. Harvey.

MEDICAL ENTOMOLOGISTS :

C. B. Symes.

J. I. Roberts.

LABORATORY SUPERINTENDENT :

F. A. Bailey.

LABORATORY ASSISTANTS, SENIOR GRADE :

H. M. Nefdt.

W. L. Titman.

J. P. McMahon.

A. H. Daws.

W. A. Doust.

E. C. Young.

LABORATORY ASSISTANTS, JUNIOR GRADE :

W. E. Grainger.

T. Jones

L. Burton.

LABORATORY ASSISTANTS, NON-EUROPEAN :

Ramji Das.

W. Pema (until 1st April, 1932).

J. St. A. M. de Souza.

Elisha Nyalondo.

Gideon Otieno.

MALARIA FIELD OVERSEER :

J. O. Harper.

LIBRARIAN AND STENOGRAPHER :

Miss J. M. C. Millett.

STOREKEEPER :

Max de Souza.

A.—ADMINISTRATION.**1.—Changes in Staff.**

Mr. W. Pema, Laboratory Assistant (Non-European), terminated his appointment on 1st April, 1932.

Dr. P. C. C. Garnham, Malaria Research Officer, resumed duty with the Sanitation Division 1st June, 1932.

2.—Leave.

Mr. J. O. Harper returned from leave on 21st January, 1932.

Mr. T. Jones returned from leave on 12th March, 1932.

Mr. Max de Souza returned from leave on 14th April, 1932.

Mr. A. H. Daws proceeded on leave on 16th April, and returned on 19th November, 1932.

Mr. F. A. Bailey proceeded on leave on 6th May, and returned on 29th November, 1932.

Mr. J. Burton proceeded on leave on 6th May, and returned on 19th November, 1932.

Miss J. M. C. Millett proceeded on leave on 15th May, and returned on 1st November, 1932.

Mr. W. E. Grainger returned from leave on 17th May, 1932.

3.—Staff.

Although the Medical Department has been much reduced in staff owing to the need for economy, the Laboratory Division has been fortunate in only suffering the loss of two officers. Dr. Garnham, who was lent to the Division in May, 1930, to carry on research work in malaria, resumed his duties with the Sanitation Division in June of this year. Since his departure the examination of blood slides for the malaria surveys which are being carried out in different parts of the country, came immediately under the supervision of the Deputy Director of Laboratory Services. All other research in which Dr. Garnham was engaged had to cease, as it was impossible for anyone else on the staff to take on any additional duties. The second officer, whose services were lost, was Mr. Pema, one of the non-European laboratory assistants, who had been in charge of calf lymph production. His work was taken over by Mr. Ramji Das, who, therefore, had less time available to work in the Biochemical Section.

No additions have been made to the numbers of African laboratory assistants during the year, owing to the necessity for the strictest economy. As a result, several requests for the posting of African laboratory assistants to hospitals had to be refused. In two instances the desire for additional help in the laboratory work of the hospital was so great, that the medical officers sent up dressers to be trained. Naturally, it was not possible to give these boys the same intensive instruction as the laboratory assistant usually gets, but they were taught the elements of blood examination, faeces examination and the staining of exudates such as pus, sputum, etc. This training should, however, meet the requirements of the medical officers who in these two instances required an extra boy to do the laboratory work for them while they were on safari.

The standard required from African laboratory assistants is high, and in several cases it was found that boys who had been given a certain amount of training were incapable of becoming sufficiently efficient to discharge their duties properly. The services of these boys were therefore dispensed with, and the vacancies were not filled for financial reasons.

4.—Buildings.

No additions have been made to the Laboratory during the year. An attempt has been made to lay out the grounds, but the work has only progressed very slowly owing to the labour available being very limited. It is hoped that when funds are once again available, it may be possible to erect a garage, and enable the unsightly line of cars in the front of the building to be moved to a less conspicuous position.

5.—Library.

Several new books have been added to the Library, and the new catalogue on the loose-leaf system is completed. Pamphlets have been surveyed, and the number lessened by removing duplicates. Owing to the necessity for economy the number of periodicals taken has been reduced, and a further decrease in expenditure has been attained by an arrangement with the Veterinary Research Laboratory, whereby journals which were formerly taken by both laboratories, are now taken by one only and then circulated to the other.

6.—Finances.

Below is set out, as in last year's Report, a table showing the expenditure on the Laboratory for 1932, and the value of the products manufactured and of work done. Account has only been taken of the vaccines, drugs, etc., prepared in the Laboratory which would have had to be purchased from outside sources, and the prices used for the preparation of the estimate are actual tenders, or are obtained by reducing the wholesale prices of British firms. No account has been taken of freight or other charges, the cost of which may be estimated at approximately 20 per cent of the figures given.

LABORATORY EXPENDITURE AND VALUE OF PRODUCTS, 1932

ACTUAL EXPENDITURE

	£
European staff	10,733
Non-European	3,026
Medical Store vote and Upkeep	1,555
	<hr/>
	£ 15,314

VALUE OF VACCINES PREPARED AND FEES COLLECTED

	£
Calf lymph issued 222,218 doses @ 4½d.	4,166
T.A.B. Vaccine issued 1,720 „ @ Sh. 1/6	129
Plague Vaccine „ 45,140 „ @ Sh. 1/6	3,406
Rabies vaccine „ 6,400 c.c. @ Sh. 1/6 per c.c.	4,337
Bismuth „ 175,413 doses @ Sh. 3/3 per 15 doses	1,900
Vaccines various stock 1,310 c.c. @ Sh. 1/- per c.c.	65
Vaccines various autogenous .. 125 @ Sh. 100/- each	625
Fees collected in cash	812
	<hr/>
	£ 11,583

In addition, the following were made to act as a reserve in case of epidemics :

	£
T.A.B. Vaccine 6,280 „ @ Sh. 1/6	471
Plague Vaccine 284,590 „ @ Sh. 1/6	21,344
Rabies Vaccine 6,256 „ @ Sh. 1/6 per c.c.	469
	<hr/>
	£ 22,284

No account has been taken of the immense amount of ordinary diagnostic work carried out on behalf of Government Departments. In addition, the fact must not be overlooked that research work is constantly in hand to determine, if possible, the causes of disease in the Colony, and suggest methods of prevention.

7.—General Survey of Routine Work.

As this will be the last Report which I shall write as Deputy Director of Laboratory Services in Kenya, a brief recapitulation of the history of the Laboratory will not be out of place. The story has been one of constant extension, particularly since the end of the great war. When Dr. P. H. Ross first took over charge he was associated with the Veterinary Bacteriologist, and between them they dealt with all bacteriological, chemical and toxicological examinations of human and animal material, as well for Uganda as for what was then the British East Africa Protectorate. It was during this

time that Dr. Ross carried out so much of the research work, particularly on trypanosomes and spirilla, for which his name will always be remembered. It was found, however, that the organization was unsuitable; the medical work was therefore divorced from the veterinary, and in 1911 it was also considered essential that an analyst should be appointed to take over charge of the chemical and toxicological examinations. Later still an assistant to Dr. Ross was appointed in the person of Dr. J. Harvey Pirie, who assumed duty as Pathologist and Assistant Bacteriologist in 1913. In 1914, the Laboratory was made into a separate department, with Dr. Ross as Director. This arrangement persisted until the close of the war, but early in 1919 Dr. Ross was invalided, and, Dr. Pirie having been transferred to South Africa in 1917, the Bacteriological Section became the Laboratory Division of the Medical Department, while the Chemical Section was enlarged and converted into the Department of Chemical Research under the Directorship of Mr. Kirkham. At that time the Bacteriological Section consisted only of two officers and two Indian laboratory assistants, but it was speedily found necessary to increase this staff to cope with the ordinary routine work, which included the preparation of calf lymph and examination of clinical material on behalf of the various hospitals of the country. As the staff expanded, the need for increased accommodation was acutely felt, and as early as 1920 plans for a new Laboratory were designed and taken to England for the consideration of the Advisory Medical Committee of the Colonial Office. The plans, with some slight modification, were passed, and it was anticipated that the new Laboratories would be commenced in 1921 or 1922, but unfortunately the finances of the Colony did not permit of it, and when the situation improved, various difficulties arose about the site, so that it was not until 1928 that funds were voted which enabled work to be commenced. Meanwhile, on the promotion of Mr. Kirkham to be Director of Agriculture, Zanzibar, the Chemical Research Department was broken up, part of the staff being transferred to the Agricultural Department, and part to the Medical Department for amalgamation with the Laboratory Division. Since that time the staff of the Division has been gradually augmented to cope with the increased work demanded of it, an increase due not only to the larger medical staffs in the older established hospitals, but also to the extension of medical work in native reserves, and the erection of a number of new hospitals. The provision of small clinical laboratories at the various hospitals in the Colony, and the need for keeping them under constant supervision, has made the duties of the Deputy Director of Laboratory Services largely administrative and advisory. Looking back on the work as it existed in 1919 when I first took over, it is astonishing how extensively and yet how quietly the routine and research work has increased, and this in spite of two set-backs when the financial condition of the country entailed retrenchment in 1922 and 1931-32. Figures are given below showing the routine work carried out by the various sections during 1932, as compared with 1930 and 1931.

		1930	1931	1932
Serological Section ..	.. .. .. .. ..	3,146	3,282	2,906
Pathological Section ..	.. .. .. .. ..	384	458	1,153
Bacteriological Section ..	.. .. .. .. ..	2,120	3,163	2,421
Section of Medical Biology ..	.. .. .. .. ..	17,639	15,827	13,806
Malaria Section ..	.. .. .. .. ..	14,000	8,000	2,756
Biochemical Section ..	.. .. .. .. ..	950	1,517	1,083
Analytical Section ..	.. .. .. .. ..	361	201	430
Clinical Laboratory, Native Hospital, Mombasa ..	..	15,304	11,388	12,028
Number of doses of calf lymph manufactured ..	..	488,700	231,315	205,815
Number of doses of plague vaccine manufactured ..	..	410,000	290,000	330,000
Number of doses of T.A.B. vaccine manufactured ..	..	14,000	8,000	8,000
Number of doses of bismuth manufactured ..	..	85,901	135,089	175,143

The Kahn test is still the standard reaction for the examination of sera for syphilis and yaws. The Wassermann test has been used to a larger extent this year as a check on the first-named reaction. It will be noted that sera received for the Widal test showed a positive reaction for *Br. abortus* in nine

Africans and one European. It is probable that if all patients who exhibited indefinite symptoms unresponsive to quinine, were tested serologically, many more cases of Undulant fever would be recorded.

Calf lymph has been manufactured by the same methods as in previous years. During 1932 a definite contract was made with the Medical Department in Uganda, for the supply of all calf lymph and other vaccines required by that Protectorate from this Laboratory. It will be noted in the report of the Calf Lymph Section that the amount of lymph supplied to Uganda was actually in excess of that issued for use in Kenya. As this Report is written in the early days of 1933, it may be mentioned that an order for 50,000 doses of lymph has been received from Italian Somaliland. Trial consignments of lymph have also been forwarded to the Medical Department in Southern Rhodesia, but no report has been received so far as to its efficacy.

The cost of lymph per dose is slightly increased this year owing to black-coated calves only being available. This reduced the yield of pulp per calf and consequently raised the cost of manufacture of lymph.

Autopsies have been carried out as a routine in cases dying at the Native Hospital, the Infectious Diseases Hospital and Mathari Mental Hospital, Nairobi, and also in cases found dead in the Nairobi Municipal area and deposited at the Town Mortuary. Unfortunately the number of post-mortem examinations made at the Native Hospital has considerably decreased, for whereas in 1931 one hundred and sixty autopsies were carried out, this year one hundred and eight were performed, of which forty-six only came from the Native Hospital. An analysis of the figures from the various institutions shows that the difference in the total for the two years is almost entirely due to the reduction in numbers obtained from the Native Hospital, Nairobi.

The Pathological Museum has grown considerably during the year. Some of the specimens are very rare, and several of them refute accepted beliefs that Africans are immune to certain pathological conditions such as gall stones and renal calculus.

In the Bacteriological Section the number of specimens examined during the year is somewhat reduced compared with 1931. This is partially due to the fact that the Bacteriologist was on leave for the first half of the year, and also to the demands made upon his time for the preparation of anti-rabic vaccine. The preparation of plague vaccine has continued, and, as has already been stated above, not only this vaccine but also all other vaccines, are now prepared for both Uganda and Kenya. The demand for anti-rabic vaccine has increased very considerably during this year owing to an epizootic of rabies in the carnivora of the Kisii, Tumbwa and Sotik districts. The strength of the vaccine has been increased from a 1 per cent suspension to a 2 per cent. Unfortunately, an attempt to prepare a vaccine from a Kenya strain of rabies has failed up to the present, as the street virus obtained from Kisii refused to become "fixed" except at a ten-day period. It is hoped by alternate passage through guinea-pigs and rabbits to reduce this period to the normal one for "fixed" virus.

The routine work of the Entomological Section has proceeded on much the same lines as in former years. Measures directed against tsetse-fly will be dealt with under "Research". An attempt has been made to treat tropical ulcers by a modification of the methods which have recently been advocated in America for osteomyelitis, namely, the use of blow-fly larvae. Our method has been to crush the maggots, make an extract of them in normal saline, and afterwards pass this through a bacteriological filter, carbolic acid then being added in sufficient quantity to produce a concentration of 0.5 per cent in the final preparation. Good results have been obtained by dressing even the foulest ulcers with this liquid, and it is probable that its use will enable skin grafting to be done much sooner than the more usual method of cleansing with fomentations and antiseptics permits.

There has been a reduction in specimens submitted for examination in the Biochemical Section, which is largely attributable to the fact that a European laboratory assistant was not available during the greater part of the year. There has, however, been a considerable increase in the quantity of bismuth prepared, amounting to some 53,000 additional doses. The help of the Biochemist was sought by the Nakuru School Committee, with a view to modifying the diet of the children at the school so as to make it more suitable for their needs in the light of modern knowledge of nutrition.

8.—Research.

GENERAL.

Owing to the atmosphere of uncertainty as to the future of the individual members of the staff, which has overhung the Laboratory as a result of the Government investigation into possible economies of administration, it has been impossible to embark on any long-term scheme of research. Consequently, investigations have largely been confined to a continuance of work begun in previous years, or to the solution of problems arising either in the course of routine laboratory work, or in the clinical work of the hospitals. A great step forward has been taken this year in the co-ordination of research in the East African territories, for, at the request of the Kenya Government, Mr. Swynnerton, Director of Tsetse Research, Tanganyika, paid two visits to the Colony, partly to examine the control measures adopted by the Entomologists of the Department against tsetse-fly, and partly to institute a new series of experiments to determine the possibility of control of this fly by limited bush-clearing followed by trapping. Arrangements have also been made so that there shall be no over-lapping in the work which has been going on for some time to determine the usual hosts of the tsetse-fly by the application of the precipitin test to the stomach contents of the fly. It has now been arranged that *G. palpalis* and *G. pallidipes* shall be investigated in Kenya, and *G. morsitans* and *G. swynnertoni* in Tanganyika. It should be possible by an extension of this arrangement to other investigations, to eliminate inter-colonial boundaries where scientific work is concerned, and permit without the possibility of friction the worker, who has had special experience in some particular subject, carrying out his researches without hindrance from territorial limitations. It should also allow the different Governments to obtain the advice of specially qualified officers from another colony without difficulty and without multitudinous correspondence.

The subjects which have been investigated this year will be considered below, under separate headings :—

(a) *The Macroscopic and Microscopic Anatomy of the Brain of the African.*

The work which was reported last year on this subject has been continued. A preliminary note was published early in the year in the *East African Medical Journal*, and aroused a considerable amount of interest, not only amongst the members of the medical profession in the Colony, but also in the lay population. The work reported then has been continued on the same lines in order to rebut the criticism which might be levelled that the conclusions were based on the examination of a very limited number of specimens. Sections therefore have been prepared of a much larger number of brains, but the examination of these was not completed by the end of the year. In the course of this work Dr. Vint has found that a considerable number of these brains show a well-developed fissure corresponding to the "Affenspalte" of the brain of the ape. This observation is very interesting as Duckworth has recorded the presence of a similar sulcus in 60 per cent of aboriginal brains.

(b) *Dysentery.*

Owing to the very limited number of cases which have occurred during the year, very little additional work has been done in this subject, but the results obtained confirm the conclusions of the preceding year. The Lister Institute has now agreed to add the bacillus which has been called "Shigella B." and also the local strain of Schmitz's bacillus, to the other strains from which their anti-dysenteric serum is prepared.

(c) *Plague.*

The investigations this year have not been so numerous as in the preceding, owing to the absence on leave of the Bacteriologist. Those that have been made have been directed to the production of a less toxic vaccine with high immunizing power as suggested by Schutze. It is hoped that if the tests are satisfactory it may be possible to manufacture a vaccine equally as efficient as the present, and very much less unpleasant in its effects. At the request of the Uganda Medical Department, experiments were carried out at Mombasa by the Medical Entomologist to determine whether rats or rat-fleas can be conveyed in trucks bringing cotton-seed from Uganda to Mombasa. The result of the investigation shows that the risk of conveyance of plague infection with cotton-seed by rats or rat-fleas to the Coast is very remote.

(d) *Water Supplies.*

The question of evolving a test for the purity or otherwise of water supplies in the tropics has engaged the attention not only of this Laboratory but of other laboratories in other tropical and sub-tropical countries. In England the absence of *B. coli* in the water is considered the most reliable criterion of potability, but in the tropics where the multiplication of organisms is encouraged by the temperature conditions and fouling of water by wild game is common, it has been found that waters which are undoubtedly free from the possibility of contamination by human excreta, still show a high *B. coli* content. A further step in the elucidation of the problem in Kenya was taken when the Koser citrate-utilization test was applied to these organisms, for it showed that a considerable number were derived from non-animal sources. This year the investigation has been carried still further by undertaking the examination of a series of samples of the faeces of wild animals. This work is still proceeding, but up to the present the indications are that the bacteriology of the faeces of wild animals as far as the coliform organisms are concerned, is similar to that of human beings. If this still proves to be the case when a much larger number of samples have been tested, then it will have been definitely demonstrated that only by a sanitary survey of the catchment area of a water supply can an answer be given to the question of the possibility or otherwise of its contamination from human sources.

(e) *Malaria.*

Most of the work this year in connexion with this disease has been concerned with malaria surveys in different districts in the Colony. At our request an experiment was carried out at the Native Hospital, Nairobi, by Dr. Trowell designed to compare the relative values in treatment of quinine, and a sample of cinchona febrifuge which was obtained through the courtesy of the Government of India. The results of the test showed that the two drugs were apparently equally efficacious in the treatment of the disease. Further experiments are in progress to test the relative value of quinine, atebrin and tebetren in the treatment of malaria amongst Europeans. Dr. Gartham who had been seconded early in the year as Malaria Research Officer at the Laboratory, returned to duty with his own Division in June, 1932. It is understood, however, that at Mombasa he has carried on his investigation of the morphology of the malaria parasite as seen in Kenya, and that a paper embodying the results of his researches will shortly be published by him in the *East African Medical Journal*.

The Entomological Section has been making investigations to determine those properties of oils and oil mixtures which render them suitable for use in mosquito control. This work is extremely difficult on account of the variability of the results obtained, so that it is impossible to draw any very definite conclusions until a very large number of experiments have been completed. In this investigation some sixty fractions of oil obtained by distillation have now been tested.

(f) *Tropical Typhus.*

Considerable progress has been made in the determination of the vector of this disease in Nairobi. One species of tick, namely, *Rhipicephalus sanguineus*, has been definitely incriminated, as specimens caught in a house in which a case of typhus had occurred, when crushed and inoculated into guinea-pigs, provoked a reaction typical of infection with *Rickettsiae*, and produced in the tissues of the animals rickettsia bodies. One other species of tick belonging to the same genus, *R. pulchellus*, although not proved experimentally to be capable of transmitting the infection, was definitely associated with the initial lesion in a case of typhus.

(g) *Trypanosomiasis.*

This has been largely dealt with above, as the main work of research in connexion with this disease had been the arrangement of a series of experiments to test whether it is possible to eliminate the tsetse-fly by a limited amount of bush-clearing assisted by trapping. To this end, a request was made for assistance from the Colonial Development Fund for the carrying on of a two years' experiment. This grant has just been made, and work should be commenced early in 1933. Limited experiments already carried out with a small number of traps in South Kavirondo indicate that there are indeed possibilities of real fly control by this method, but the exact conditions necessary to obtain the greatest catch have not yet been worked out. Tests have been made to determine whether certain animal extracts will attract the flies by scent, and some of these have been apparently extremely successful in increasing the number of flies settling on the trapping screen.

(h) *Calf Lymph.*

Unfortunately, the hopes expressed in last year's Report of the possibility of obtaining calf lymph by cultivation in tissue culture, have not been realized, and the experiments were still in progress at the end of the year. A new method of preparing calf lymph by emulsifying the pulp in an egg albumin mixture instead of in 50 per cent glycerine was tested, as it was reported to preserve the activity of the lymph in adverse conditions better than the more customary method of manufacture. Both types of lymph after spending three weeks in the incubator at 37° C., were exposed to the sun, and when tested the lymph made with glycerine was quite inert, while that made with egg albumin retained a considerable degree of activity.

(i) *Biochemical Investigations.*

The demands of routine work on the staff have prevented much research being done, but the analysis of local foodstuffs obtained from different areas in the Colony has been continued with very interesting results. In addition, preparations have been made to test the vitamin content of certain vegetable and animal extracts, among which is *Bix oriolana*, which is said to contain as much vitamin A as cod liver oil, and grows profusely in different parts of this territory.

The following articles have been published by members of the Laboratory staff during 1932 :—

C. B. Symes :

"Observation on Anophelines and Malaria in Kitale—with Notes on Experimental Control with Paris Green" (*Kenya and East African Medical Journal*, Vol. VIII, pp. 256 and 280).

F. P. G. de Smidt :

"A Note on Laboratory Diagnosis of Plague Infections" (*East African Medical Journal*, Vol. IX, p. 2).

C. B. Symes and J. I. Roberts :

"A List of the Muscidae and Oestridae causing Myiasis in Man and Animals in Kenya, recorded at the Medical Research Laboratory, Nairobi" (*East African Medical Journal*, Vol. IX, p. 18).

F. W. Vint :

"A Preliminary Note on the Cell Content of the Prefrontal Cortex of the East African Native" (*East African Medical Journal*, Vol. IX, p. 30).

F. W. Vint :

"An unusual complication of Pneumonia" (*East African Medical Journal*, Vol. IX, p. 84).

H. D. Tonking :

"Preliminary Observations on the Etiology of Kenya Typhus" (*East African Medical Journal*, Vol. IX, p. 152).

F. P. G. de Smidt :

"Nairobi Plague Prophylactic : Further Notes on Preparation and Potency" (*East African Medical Journal*, Vol. IX, p. 227).

B.—SEROLOGICAL SECTION.

1.—Staff.

The duties of this Section were carried out by the staff of the Medical Biology Section.

2.—Widal's Reaction.

Europeans	...	...	66	negative	37
Asians	...	...	31	„	19
Africans	...	...	242	„	152
			—		—
			339		208
			—		—

Of the organisms showing agglutination by the various sera, 70 per cent were *B. typhosus*. *B. paratyphosus A*, *B* and *C* agglutinations were also encountered, as well as those for *Br. abortus*: the latter in nine Africans, and one European. Weil Felix reactions were done with four sera from Europeans; two showed agglutination with *B. proteus X*₂, while the other two showed no agglutination with any of the organisms tested.

3.—Blood Grouping.

Thirty samples of blood were grouped during the year.

4.—Immunity Tests for Syphilis and Yaws.

A total of 2,328 Kahn tests were made during the year. From time to time a series of Wassermann reactions was done as a cross check on the Kahn test, and for the purpose of testing cerebro-spinal fluids.

Of the sera submitted for Kahn tests those of 1,306 males and 958 females had sufficient data accompanying them to be of some value. A curve was plotted for each group of sera showing the degree of positiveness (0, +, ++, ++++, ++++). The curves of the two series ran almost exactly parallel. A series of 163 apparently healthy males were examined, and the curve was again very similar. Working out the curves on a percentage basis the supposedly healthy persons show a rather lower curve at the points of high degree of positiveness and a higher curve at the points of low degree of positiveness, while they actually show a lower percentage completely negative than persons supposed to be suffering from yaws or syphilis.

5.—Miscellaneous.

A number of miscellaneous examinations were performed, mainly of a medico-legal nature such as the examination of weapons, etc., for human blood-stains, vaginal smears for spermatozoa, and so on.

C.—CALF LYMPH SECTION.**1.—Staff.**

The manufacture of calf lymph during the year was supervised by the Senior Bacteriologist. Mr. Ramji Das was the laboratory assistant in charge.

2.—Production of Calf Lymph.

The demand for calf lymph from Kenya was still lower this year than in 1931, but the total issues were considerably swelled by the sale of lymph to Uganda.

Experiments have been continued with a method of growing lymph *in vitro*, but unfortunately the results have been so variable that the procedure could not yet be considered suitable for the routine manufacture of lymph.

3.—Summary of Calf Lymph Production during 1932.

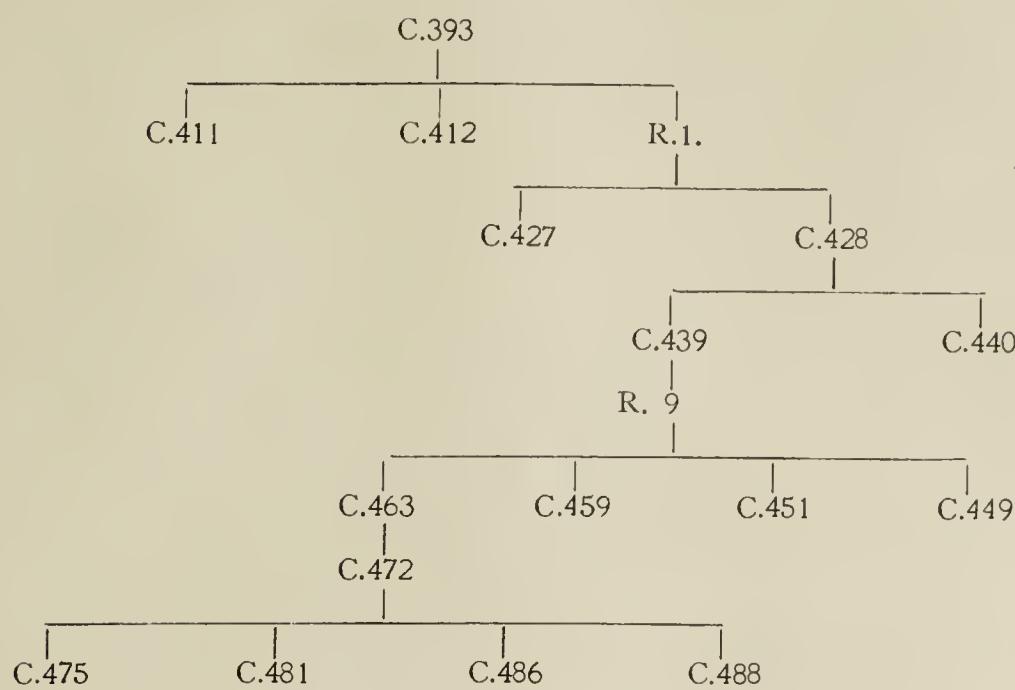
Total number of calves received	...	...	...	77
Total number of calves vaccinated successfully	...	...	...	70
Total number of grammes of pulp collected	...	...	...	701.15
Average yield per calf in grammes	...	...	...	10.02
Number of doses manufactured	...	...	...	205,815
Number of doses of 1931 brought forward	...	...	...	308,315
Number of doses issued during the year	...	...	...	222,218
Number of doses remaining on hand on 31st December, 1932	...	...	...	262,215
Cost of calf lymph production	...	...	...	£271-9-0
Cost per dose manufactured	...	...	...	0.312 pence

4.—List of Stations and Amount of Calf Lymph supplied in 1932.

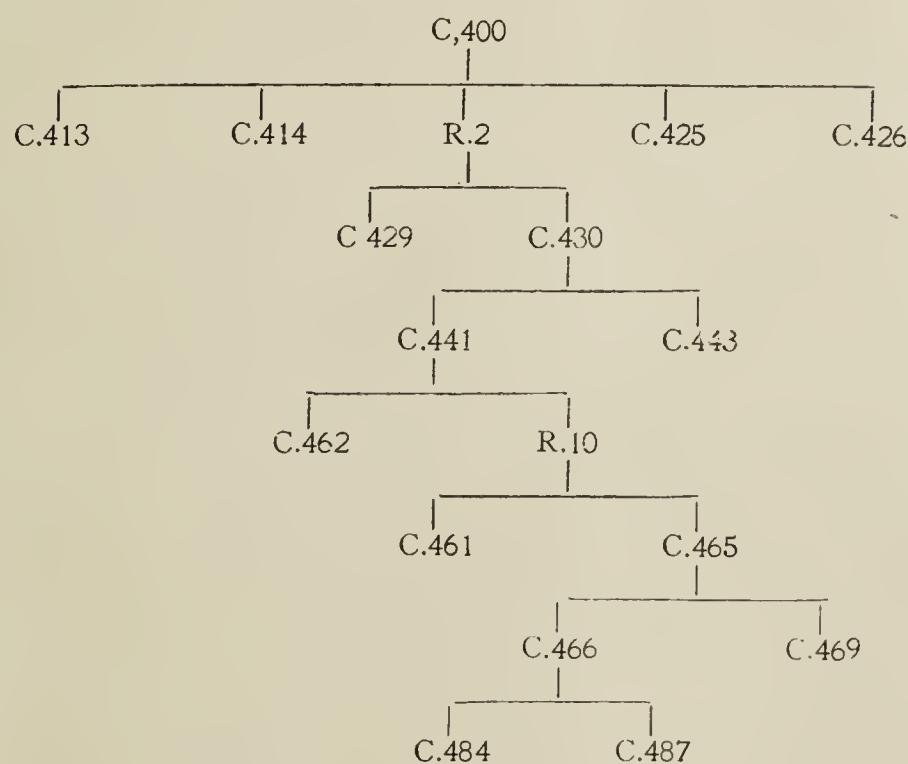
Eldoret	...	...	...	...	...	12,55
Fort Hall	...	...	...	...	...	1,480
Kakamega	...	...	...	...	...	26,000
Kapsabet	...	...	...	...	...	624
Kericho	...	...	...	...	...	776
Kisii	...	...	...	...	...	7,800
Kisumu	...	...	...	...	...	5,475
Kitale	...	...	...	...	...	158
Kitui	...	...	...	...	...	2,340
Lamu	...	...	...	...	...	2,400
Machakos	...	...	...	...	...	1,360
Malindi	...	...	...	...	...	600
Meru	...	...	...	...	...	1,800
Miscellaneous	...	...	...	...	...	661
Mombasa	...	...	...	...	...	26,000
Nairobi	...	...	...	...	...	1,250
Nakuru	...	...	...	...	...	8,320
Nyeri	...	...	...	...	...	273
Rhodesia	...	...	...	...	...	450
Tumutumu	...	...	...	...	...	89,022
Uganda	...	...	...	...	...	127,975
Voi	...	...	...	...	...	5,200
						<hr/>
						Total ... 222,218
						<hr/>

5.—Tables showing the History of each Calf Lymph-Strain.

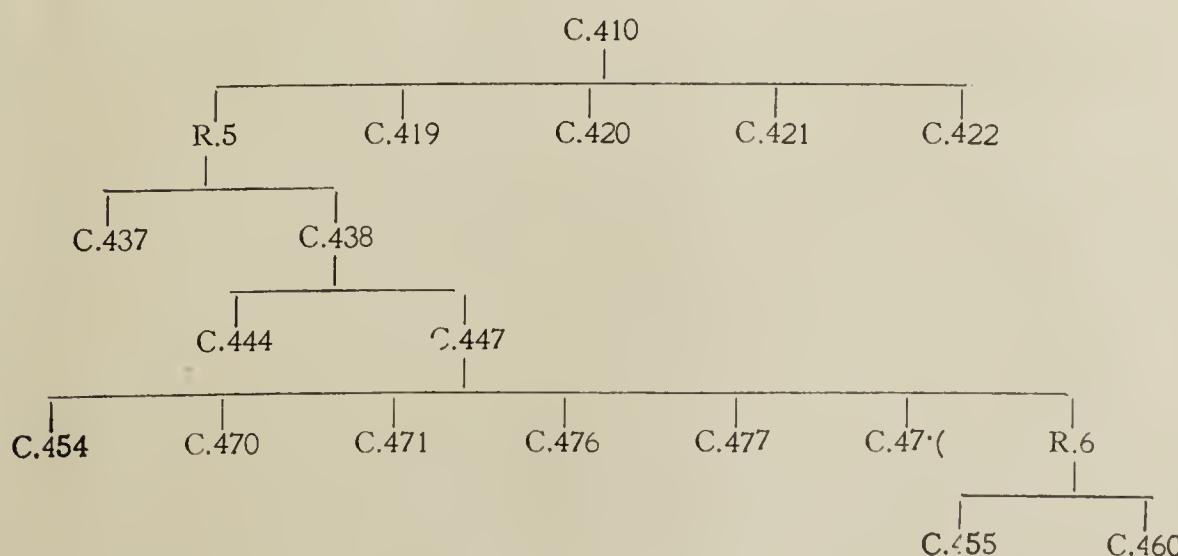
BELGAUM STRAIN—1932.



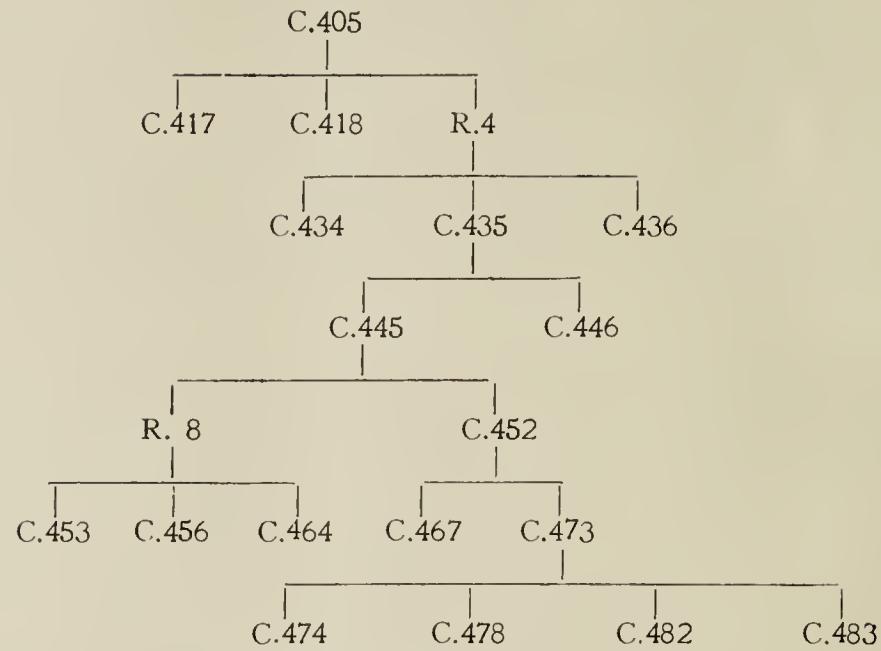
BANDŒNG STRAIN—1932.



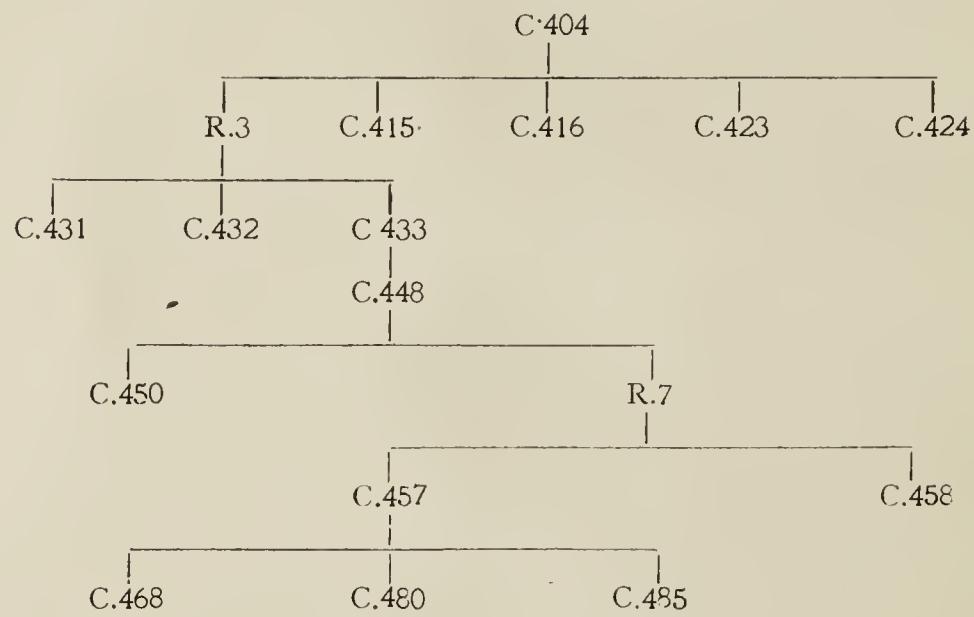
SOUTH AFRICAN STRAIN—1932.



PARIS STRAIN—1932.



ZANZIBAR STRAIN—1932



VACCINATION RETURN, 1932

D.—PATHOLOGICAL SECTION.**1.—General Survey of Work Done.**

One hundred and eight post-mortem examinations were carried out during the year. It is to be regretted that the number of these examinations show a steady decline from year to year, as much valuable and interesting material is thus lost.

In an attempt to improve the registration of the cause of death amongst the native population in the Nairobi Municipality area the pathologist was directed to carry out post-mortem examinations on the bodies of natives who had died without receiving medical attention. The arrangement has been far from satisfactory as many of the deceased are either Christians or Mohammedans, and the relatives strenuously object to the examination, so that the death certificate is issued on the history of the case as outlined by the relatives; a very unsatisfactory procedure.

The number of post-mortem examinations carried out at the request of the different authorities was as follows :—

Native Hospital	...	...	...	...	...	...	46
Infectious Diseases Hospital and Prison Hospital	...						21
Municipality	...	...	...	...	...	...	20
Police	...	...	...	...	...	...	13
Mathari Mental Hospital	...	...	...	...	...	...	8
							—
						Total	108
							—

During the year there was a very gratifying increase in the number of specimens submitted for histological examination, the number being double that examined in any previous year. This is entirely due to the increased number of both operation and post-mortem specimens received from the doctors in charge of the native hospitals throughout the Colony. The number of specimens from Europeans and Asians remained practically unchanged.

Dr. Proctor and Dr. Hargreaves have been kindly supplying specimens of chronic ulcers of the leg removed at operation. Unfortunately, up to the present one is unable to form any definite opinion on this condition owing to the diverse histological findings. Roughly, the ulcers can be classified under the following headings :—

1. Ulcers showing a marked overgrowth of fibrous tissue, with great thickening of arterial walls and narrowing of the lumen of the vessels. In these the infiltration of inflammatory cells is not marked.
 2. Ulcers showing a small lymphocytic-celled infiltration.
 3. Ulcers with a marked eosinophilia.
 4. Ulcers with foreign bodies present.
 5. Ulcers showing epitheliomatous changes.
- This work is being continued.

Research work on the brain of the East African native was continued during the year. A large number of specimens have been prepared, but it has been impossible to complete a detailed examination of them all.

2.—Pathological Museum.

During the year a large number of specimens have been added to the pathological museum, which now contains a hundred and sixty-two different specimens of morbid anatomy, many of which are very valuable as the

conditions are very rarely seen. While the majority of the specimens are derived from post-mortem examinations made by the pathologists, the museum is also indebted to all members of the medical profession in Kenya for their courtesy in supplying specimens. Recently a number of excellent photographs of clinical conditions have been received, and it is to be hoped that doctors possessing such photographs will send copies to the museum.

During the year Mr. H. L. Harger presented some valuable and interesting relics of Dr. Livingstone and Dr. Stanley, and at present there is housed in the museum models used by the Public Health authorities for propaganda purposes amongst the natives.

3.—Post-mortem Examinations.

(a) EUROPEAN—

Septicæmia	1
Poisoning (Potassium cyanide)	1
TOTAL EUROPEAN .. —	2

(b) INDIAN—

Shock following injuries	1
--------------------------------------	---

(c) AFRICAN—

Abscess, cerebral	1
,, lung	1
Aneurysm of abdominal aorta, rupture of	1
Bronchitis and asthenia	1
Carcinoma, liver	1
,, rectum	1
Cirrhosis of liver	2
Dysentery bacillary	2
Epithelioma, scalp	1
Gastro-enteritis	2
Hæmorrhage, cerebral	1
Hepatitis following carbon tetrachloride	1
Ileus paralyticus	1
*Intestinal obstruction	3
Malaria	1
,, cerebral	2
,, and spontaneous rupture of spleen	1
Meningitis meningococcal	2
Myocarditis	1
,, syphilitic	4
Nephritis interstitial	3
,, parenchymatous	1
Osteomyelitis and cerebral abscess	1
Plague	2
Pneumonia	18
,, and meningitis	6
,, and pericarditis	2
,, terminal and G.P.I.	2
,, broncho-	1
Poisoning	2
Septicæmia	9
Suffocation following syphilitic ulcer of the larynx	1
Tetanus	1
Tuberculosis	6
Tuberculus meningitis	3
Tuberculoma of brain	1
Typhoid	7
Violence :	
Fracture of skull	4
Hæmorrhage from wounds	1
Rupture of liver	1
Rupture of spleen	1
Transverse myelitis of cord	1
Wound of spinal cord	1
TOTAL AFRICAN .. —	105
GRAND TOTAL	108

*Two of these cases were due to impacted masses of *Taenia saginata*.

4.—Histological Examinations.

(a) OPERATION SPECIMENS—

(1) Europeans :

Tumours, Benign ..	..	..	..	..	20
„ Malignant ..	..	..	..	..	13
					—33
Curettage, Non-malignant ..	..	..	..	..	18
„ Malignant ..	..	..	..	..	1
					—19
Inflammatory ..	..	..	..	..	12
Liver cirrhosis ..	..	..	..	..	1
Normal tissues ..	..	..	..	..	5
					—18
					— 70

(2) Asiatics :

Tumours, Benign ..	..	..	..	..	2
„ Malignant ..	..	..	..	..	1
					— 3
Curettage, Non-malignant ..	..	..	..	..	2
Inflammatory ..	..	..	..	..	2
Normal tissue ..	..	..	..	..	5
					— 12

(3) Africans :

Tumours, Benign :

Adenoma ..	..	..	..	..	5
Curettage, Non-malignant ..	..	..	..	..	5
Cysts ..	..	..	..	..	2
Fibroma ..	..	..	..	..	9
Glioma ..	..	..	..	..	1
Hæmangioma ..	..	..	..	..	4
Lipoma ..	..	..	..	..	1
Osteoma ..	..	..	..	..	2
					— 29

Tumours, Malignant :

Carcinoma ..	..	..	..	..	14
Endothelioma ..	..	..	..	..	5
Epithelioma ..	..	..	..	..	16
Melanoma ..	..	..	..	..	12
Mixed Tumour of Parotid ..	..	..	..	..	2
Myeloma ..	..	..	..	..	1
Sarcoma ..	..	..	..	..	8
Teratoma ..	..	..	..	..	2
					— 60

Inflammatory ..	..	..	..	..	*91
Syphilitic ..	..	..	..	..	5
Tuberculous ..	..	..	..	..	17
Fungus ..	..	..	..	..	1

Hodgkins Disease ..	..	..	..	..	114
					— 3

— 206 208

(b) POST-MORTEM SPECIMENS—

Africans :

Tumours :

Adenoma ..	..	..	..	..	2
Carcinoma ..	..	..	..	..	5
Epithelioma ..	..	..	..	..	2
Saecoma ..	..	..	..	..	2

— 11

Malarial tissues ..	..	..	..	..	15
Tuberculous lesions ..	..	..	..	..	6
Other inflammatory lesions ..	..	..	..	..	5
Normal tissues ..	..	..	..	..	19

Heart :

Endocarditis ..	..	..	..	..	1
Fatty degeneration ..	..	..	..	..	1
Fibroctit ..	..	..	..	..	2
Guinma ..	..	..	..	..	1
					— 5

Lungs :

Broncho-pneumonia ..	..	..	..	..	2
Congestion ..	..	..	..	..	3
Red hepatisation ..	..	..	..	..	1
Grey hepatisation ..	..	..	..	..	1

— 7

Liver :

Chronic venous congestion ..	..	..	..	..	5
Cirrhosis ..	..	..	..	..	9
Fatty degeneration ..	..	..	..	..	5
Toxic degeneration ..	..	..	..	..	5

— 24

*Includes one case of a large growth of the cervix uteri due to *Schistosoma haematobium*.

(b) POST-MORTEM SPECIMENS—(contd.)

Kidneys :						
Interstitial nephritis	3					
Parenchymatous nephritis	6					
Toxic	7					
	— 16					
Pancreas, Fibrotic	2					
Brain, Rabies positive	1					
Spinal Cord, Myelitis	1					
Intestines :						
Bacillary dysentery	2					
Schistosomiasis	1					
Typhoid	2					
Other inflammatory lesions	4					
	— 9					
Spleen :						
Congestion	3					
Toxic degeneration	3					
	— 6					
Glands, syphilitic	6					
Brain Specimens for Research Purposes	564					
	— 693					
(c) ANIMAL TISSUES	64					
GRAND TOTAL OF ALL HISTOLOGICAL EXAMINATIONS..	1,045					

E.—BACTERIOLOGICAL SECTION.

1.—Routine Examinations.

Specimens received for microscopical examination : 1,546.

Specimens received for cultural examination : 875.

(a) *Anthrax*.—No positive examinations were recorded.

(b) *Conjunctivitis*.—Koch-Weeks bacilli were identified in six cases. Gonococci were found in one case. Morax-Axenfeld bacilli were not recorded.

(e) *Diphtheria*.—Pharyngeal swabs yielded positive cultures in thirty-four cases.

(d) *Dysentery*.—(a) *Shigella dysenteriae* (Shiga) was not recorded.

(b) *Flexner Group*.—One case only.

(c) In one case the sorbite-fermenting organism designated provisionally as "Shigella B" was recorded.

(d) *S. para-dysenteriae* of Schmitz was recovered from one case.

(c) *Gonorrhœa*.—Positive eye examinations : 1.

Positive urethral examinations: 36.

Positive vaginal examinations : 1.

(f) Leprosy.—Eleven examinations of nasal exudate were positive.

(g) *Meningitis*.—Meningococci were identified in one specimen of cerebro-spinal fluid.

(h) *Plague*.—The district was only slightly affected during the year.

Human cases.—Three specimens of gland exudate were positive.

Rats.—Of rats found dead, ten out of a total of thirty-eight examined were demonstrably plague-infected. Of rats killed by trapping, no positive cases were found in a total of fourteen examined.

(i) *Tuberculosis*.—Sputum examinations totalled one thousand and fifty-nine: of these cases one hundred and six were positive.

(j) *Pneumonia*.—Investigation of the type-incidence of pneumococci was continued, and is noted under heading of research.

(k) *Typhoid and Para-typhoid*.—*B. typhosus* has been isolated in four cases by culture from the blood, in two cases from the stool, and in one case from the urine; *B. paratyphosus A* was recovered from one specimen of stool.

(l) *Undulant Fevers*.—No examinations for the *Br. melitensis-abortus* group were recorded.

2.—Vaccine Preparation.

(a) *Autogenous Vaccines*.—One hundred and twenty-five autogenous vaccines were made, and sixty-eight patients were treated by vaccines for various conditions in the Bacteriological Section.

(b) *Stock Vaccines*.—For public issue, stocks have been maintained of various “polyvalent” vaccines made in the Laboratory, comprising Anti-staphylococcal, Anti-streptococcal, *Anti-B. acnes*, *Anti-gonococcal*, and *Anti-catarrhal* vaccines. The experience with the Anti-catarrhal vaccine has on the whole suggested a higher value for this type of vaccine than is often attributed to it.

(c) *Anti-Plague Vaccine*.—Three hundred and thirty thousand doses of the Haffkine-type plague prophylactic have been prepared, and forty-five thousand, four hundred and ten doses have been issued. This vaccine is still well known for its toxicity; but recent experiments (*see* under plague research) have suggested the possibility of producing a similar vaccine of much lower toxicity though of an even higher immunizing power.

(d) *Anti-Typhoid-Paratyphoid Vaccine*.—Eight doses of the special type of broth vaccine have been prepared, and one thousand, seven hundred and twenty doses have been issued. This type of vaccine is unfortunately about as toxic in its effects as the plague vaccine; but experience of its public use, as also certain tests on rabbits by Besredka’s method, suggests a satisfactory protective value; agglutination tests on the recently inoculated human subject with *B. typhosus* “O” suspension have given titres up to one in six hundred.

(e) *Anti-Rabic Vaccine*.—This is carbolized saline suspension of brain and cord of rabbits inoculated with fixed virus obtained from India in 1929. The total amount prepared of 1 per cent, 2 per cent and 5 per cent strengths has been 12.656 litres during the year, of which 6.400 litres have been issued to the treatment centres at Kisumu, Kericho, Kisii, etc.

Attempts to prepare fixed virus from Kenya sources have not so far been successful. The oldest “street” virus, obtained from Kisii, after fourteen months of continuous passage through rabbit has obstinately maintained a regular ten-day period. But now that a small surplus of guinea-pigs is available, it is hoped to achieve the desired result by alternate passage through these animals and rabbits.

3.—Water Analyses.

Twenty-four samples of various water supplies have been bacteriologically examined. The technique adopted is still provisional in character; and attention has been given to the various types of coliform bacteria, and the accepted tests for those of faecal origin, in the hope of arriving at a satisfactory bacteriological standard for Kenya waters. Notes on this point are given below.

4.—Research.

(a) *Bacteriology of Faeces of Wild and Domestic Animals, in Relation to Water-Supplies*.—Faeces have been examined from a series of wild animals, including various common species of antelope, also zebra, and a cheetah, and wildebeest, the specimens being taken direct from the intestine into sterile containers immediately after the shooting of the animals by Messrs. Doust and McMahon, Laboratory Assistants. Faeces of native domestic goats and sheep were also examined. The outstanding points recorded are:—

- (i) Commonly only one type of coli group bacillus is present in any individual animal, as judged by the form of colony on agar; though a streptococcus sometimes appeared as well.
- (ii) These faecal bacilli nearly always show Indol+MR+K—(methyl red and Koser’s citrate utilization tests). Four of the wild animals yielded a small proportion of Indol- MR- K+ types.
- (iv) Invariable correspondence is always found between Indol+ and MR+ reactions; Indol+ reactions sometimes correspond with K+.

(v) The faeces of the sheep yielded more than 50 per cent of an Indol - MR + K + type; while a suckling eland gave only the "intermediae" MR + K + and the MR - K + types.

For comparison, a sample was examined from a stream which is liable to a moderate degree of pollution from natives and their live stock. Six types of coliform bacilli were separated, of which 60 per cent were of the faecal MR + K - Indol + type, the remainder being intermediates. It is obvious that if this stream were frequented by wild animals such as zebra and antelope, and not at all by humans, the results of bacteriological analysis would have been similar.

(b) *Plague*.—In previous Reports the destructive effect of heating upon the immunizing antigen of plague vaccine has been touched on; and this point has been developed by Harry Schütze (*British Journal of Experimental Pathology*, Vol. XIII, 1922), who has shown the heat-labile immunizing antigen to be the "envelope substance" of plague bacilli, this forming more abundantly in cultures grown at 37° than at the lower temperatures hitherto adopted in Bombay and Nairobi for cultivating broth plague vaccine. Comparative tests of vaccine cultivated at 37° and at the Nairobi standard temperature of 30 ° have therefore been commenced; but owing to a temporary shortage of rats, only a preliminary experiment has so far been concluded as follows :—

Vaccine culture was inoculated for six weeks in miniature flasks in two series: A. at 37° C. and B. at 30° C. At the end of incubation, culture A had lost two-thirds of its original volume by evaporation, and B had lost one-third of its volume. Culture A was therefore made up to equal volume with B with distilled water; and both were sterilized in the cold with phenol. The growth capacity of the diluted vaccine A was now only that of 0.20 mgm. per cc. as compared with about 1.0 mgm. of B. Yet notwithstanding this inequality, the biological tests on rats gave the same high induced immunity rate of 87.5 per cent for both samples of vaccine.

Since plague culture has a much lower rate of growth at the higher temperature, and tests published by Schütze indicate a much lower toxicity in such vaccine, there is reasonable hope of issuing shortly a plague vaccine which will be much less disagreeable in its effects after injection while possessing even higher protective qualities than that produced hitherto.

(c) *Pneumonia*.—The work of typing the pneumococci from cases in the district continues, and also the serological analysis of the Group IV cocci which are predominant.

Of the series of two hundred and sixty-four cases of pneumonia so far examined, the type-incidence has been as below :—

11.7 per cent.	4.2 per cent.	4.2 per cent.	79.9 per cent.
Type I.	Type II.	Type III.	Group IV.

In all these patients, who were mostly Africans, pneumococci were isolated by mouse-culture, and were considered the causative organisms. The types KW.A., KW.E. and KW.H. have been proved to be identical with types I, II and III respectively; previously they were relegated to Group IV as serological variants of the standard types.

(d) *Bacillary Dysentery*.—The local incidence of this disease has been too small to provide sufficient material. The sorbite-fermenting dysentery bacillus called *Shigella B*, and also our local variety of Schmitz's bacillus, have been sent to the Lister Institute for incorporation in the therapeutic serum for use in Kenya.

F.—SECTION OF MEDICAL BIOLOGY.

1.—Staff.

The Section was under the care of Captain Cormack throughout the year.

As this Section is used to some extent as a depot for African personnel during their refresher courses, and in the intervals between posting and reposting, the actual composition of the native personnel varied a good deal upon a framework of a more or less permanent staff.

2.—Blood Examinations (Microscopical).

(a) Europeans.

<i>P. falciparum</i> present ...	...	...	...	123	(Cresents 1)
<i>P. vivax</i> present ...	...	...	...	5	
<i>P. malariae</i> present ...	...	...	...	2	
Filaria (not differentiated) ...	...	...	...	1	
Differential counts ...	...	...	...	478	
Total counts ...	...	...	...	36	
Examined for parasites—negative ...	...	...	1,028		
		Total	...	1,673	

(b) Asiatics.

<i>P. falciparum</i> present ...	...	...	...	111	(Cresents 4)
<i>P. vivax</i> present ...	...	...	...	27	
<i>P. malariae</i> present ...	...	...	...	3	
Mixed infections ...	...	...	...	4	
Differential counts ...	...	...	...	42	
Total counts ...	...	...	...	5	
Examined for parasites—negative ...	...	...	613		
		Total	...	805	

(c) Africans.

<i>P. falciparum</i> present ...	...	...	...	984	(Cresents 69)
<i>P. vivax</i> present ...	...	...	...	17	
<i>P. malariae</i> present ...	...	...	...	40	
<i>S. rossi</i> present ...	...	...	...	2	
Mixed infections ...	...	...	...	33	
Filaria (undifferentiated) ...	...	...	...	67	
Trypanosoma present ...	...	...	...	1	
Differential counts ...	...	...	...	28	
Total counts ...	...	...	...	47	
Examined for parasites—negative ...	...	...	5,695		
		Total	...	6,914	

3.—FÆCES EXAMINATIONS (Microscopical)

		A	B	C	Total
Total Examined .. .	.. .	892	255	4,267	5,414
Negative .. .	.. .	433	120	672	1,225
Ova of—					
<i>Taenia</i> .. .	.. .	12	13	1,314	1,339
<i>A. lumbricoides</i> .. .	.. .	6	11	601	618
<i>A. duodenale</i> .. .	.. .	8	24	1,127	1,159
<i>S. stercoralis</i> .. .	.. .	9	9	371	389
<i>S. mansoni</i> .. .	.. .	12	2	206	220
<i>E. vermicularis</i> .. .	.. .	5	2	52	59
<i>T. trichura</i> .. .	.. .	15	31	813	859
<i>S. haematobium</i> .. .	.. .	..	..	1	1
<i>H. diminuta</i> .. .	.. .	..	..	2	2
<i>H. nana</i> .. .	.. .	1	2	15	18
Larvæ of <i>S. stercoralis</i> .. .	.. .	2	11	332	345
Cysts or Other Forms of—					
<i>E. coli</i> .. .	.. .	112	34	529	675
<i>E. histolytica</i> .. .	.. .	22	2	110	134
<i>I. butschlii</i> .. .	.. .	38	6	574	618
<i>G. intestinalis</i> .. .	.. .	29	8	146	183
<i>I. hominis</i> .. .	.. .	..	..	23	23
<i>Bal. coli</i> .. .	.. .	1	..	1	2
Undiff. Flagellate Cysts .. .		385	98	3,063	3,546

G.—MALARIA SECTION.

1.—Staff.

Dr. Garnham was in charge of the Section from the date of his return from leave to the time when his period of secondment to the Laboratory terminated (1st June, 1932). From the latter date the work was supervised by the Deputy Director of Laboratory Services.

2.—Examination of Blood Slides.

Number of negative slides	...	...	2,651
Number of positive slides—			
<i>P. falciparum</i>	...	...	2,062
<i>P. malariae</i>	...	...	503
<i>P. vivax</i>	...	...	85

As in previous years double infections were common. The slides were sent in by the Medical Officers in Charge Digo District, Meru District, and the Tana River survey.

H.—SECTION OF MEDICAL ENTOMOLOGY.

1.—Organization and Staff.

Small changes have occurred in the African Staff, but numbers have remained about the same.

2.—Mosquitoes and Malaria.

Survey work has been carried out in the following places: Nairobi, Kisumu, Kakamega, Kitui, Meru and the surrounding reserve, Isiolo, Digo Reserve and the Tana River.

(a) *Nairobi*.—The routine collections and reports to the Medical Officer of Health have continued.

(b) *Kisumu*.—In January the experimental substitution of Paris Green for oil was instituted and has continued throughout the year. Local dust could not be obtained as a carrier, so that it was necessary to import a selected grade of lime from Nairobi. All details of the work are not yet available, but it may be said most definitely that control has been equal to, if not more complete than, that of previous years, and the cost of the work remarkably low in spite of the lack of local dust.

(c) *Kitui and Kakamega*.—The trained Africans have continued collection and spotting of mosquitoes during the year, such data being used by the medical officers in charge as a basis of control. In Kakamega the development associated with gold diggings has made more thorough work urgently necessary. This will be commenced early next year.

(d) *Digo and Meru*.—In both reserves members of our African staff have been working throughout the year. They provide valuable information on which the medical officers in charge are able to base measures of control. In Digo a definite attempt is being made to control rural malaria by anti-anopheline measures, and the early steps appear to have been successful.

(e) *Tana River*.—Collections of mosquitoes and other biting flies were made on the Tana in September. Remarkably few Anophelines were captured, but *A. costalis* was recorded. Further data will be obtained as opportunities arise.

(f) Tests on oils and oil mixtures were continued. The results are not by any means clear-cut, nor are they approaching finality. The following points indicate the trend of results:—

(1) Light fuel oils, used as such, vary very appreciably in killing powers.

(2) The lethal effects of mineral oils on larvae are hastened by an increase of temperature; so that oils kill more rapidly when exposed to the sun than they do in shade, but the length of time during which they continue to be effective is shortened by such increased temperature. This action is only partly due to a quicker release and loss of volatile toxic vapours at higher temperatures; it most probably results from a lowering of viscosity at higher temperatures.

(3) The addition of a highly volatile fraction such as paraffin to fuel oil increases the kill during the first thirty-six hours only and thereafter has little or no effect. It also appears to increase surface tension somewhat and therefore reduces "spreading", though the general impression is that paraffin increases spread. The addition of paraffin or oils of that class to light fuel oils in proportions greater than about one to ten appears to be useless and wasteful.

(4) Solar oil alone is a better killing agent than the fuel oils we have tested, both initially and over a period, but its superiority is not sufficient to balance its higher cost.

(5) There appears to be very little advantage in the addition of small quantities of Solar oil to paraffin and fuel mixtures: and the addition of large quantities does not increase the efficacy sufficiently to warrant the extra cost. But the use of Solar instead of paraffin with fuel oil appears to be advantageous.

(6) There is an appreciable loss of oils of high viscosity during dry periods through deposition on earth banks, vegetation and other objects in the water treated, following the lowering of the water level. Such deposits still possess low killing powers if applied to water after ten to eleven days "dry" exposure.

(7) Recommendations as to "dosages" of anti-larval oils vary from two and a half gallons per acre in America,* to a hundred and eighty-one gallons per acre in South Africa.† We find that though dosages of the order three to twelve gallons per acre do kill, these films break up quickly. Our provisional choice, where spraying is done every seven to ten days, is eighteen to twenty-one gallons per acre. This gives a film of about eighteen to twenty-one microns: anything in excess of this is doubtfully worth while.

3.—Tsetse-Fly and Sleeping Sickness.

(a) During the year a beginning has been made with bush clearing as an immediate measure of protection for populations concerned in South and Central Kavirondo in *G. palpalis* areas. Work in the former district was started in the Kaniadoto area on the Kuja River and tributaries, under the supervision of the Field Overseer, Mr. J. O. Harper. There have been many difficulties in connexion with the supply of labour, and work is therefore progressing very slowly. In Central Kavirondo, initial clearing started in Seme—a small focus of sleeping sickness infection during 1927; this is being supervised by an officer on the staff of the Provincial Commissioner, Nyanza.

(b)) We were able to invite Mr. C. F. N. Swynnerton, Director of Tsetse Research, Tanganyika, to view our infected areas and consider our proposals, and to advise us on future measures. He has placed at our disposal all his experience on trapping and bush-clearing, and has supplied us with large numbers of traps for experimental purposes. A scheme of co-operative work has been arranged with him, both experimental and practical. It is proposed

* *Southern Medical Journal*, XXII, No. 4, April, 1929.

† Health Pamphlet (South Africa), No. 435, Pretoria, 1930.

to clear sufficient bush at important water-places and canoe landings on rivers and lake shore to provide immediate protection from infection : thereafter to attempt to eradicate tsetse from blocks of bush thus isolated by these and perhaps additional clearings by trapping, screen-catching and pupae collection. A request for financial aid from the Colonial Development Fund from outside sources, based upon estimates drawn up by Mr. Swynnerton after his first visit has been submitted. This request has been acceded to, and work on the lines suggested will begin immediately. While trapping is being experimented with on the Kuja River, a co-operative trapping-out of an island in the Kisumu Gulf has been commenced with every hope of success.

(c) At the suggestion of Mr. Swynnerton we have devoted some attention to the preparation of possible baits for tsetse traps. Extracts have been prepared from the preputial, testicular and sebaceous glands, whole testicles, and scrotal fat of the bull, and from the interdigital glands of goats. These have yet to be tested.

The initial stages of this effort at inter-territorial co-operation in a common problem is very gratifying. Tanganyika officers are able to visit neighbouring territories, and recently Mr. Hancock of Uganda accompanied Dr. Jackson of Tanganyika to view the trapping at Maboko Island in Kenya. An extension of this arrangement which would allow scientific officers in Kenya a certain degree of freedom for consultation and co-operation on common problems with colleagues in neighbouring territories will tend toward economy of effort and greater efficiency.

(d) A collection has been made of bloods from game animals, and anti-sera for testing stomach contents of tsetse-flies are being prepared. This work is a portion of our subscription towards the effort at co-operation in the study and attack on the common tsetse-flies of the three territories. As far as facilities permit we hope to be able to provide data on the foods of tsetse-flies submitted from outside Kenya as well as within the Colony. A knowledge of food hosts in any district under consideration is obviously necessary for successful baiting and trapping.

4.—Tropical Typhus.

Work has continued throughout the year in the area in which the majority of cases of tropical typhus occur in the Nairobi district. A general survey has been made of the animals commonly in contact with human beings, and an investigation conducted of their ecto-parasites.

The rodents of the Kilimani area carry large numbers of fleas, mites and ticks. Dogs, unless cared for, are infested with large numbers of ticks. Game also invades the area during the drier periods of the year, and persons resident or visiting the area are attacked by the well-known "pepper" ticks. The social position and habits of the patients indicated a vector not likely to be associated with a verminous condition, and there is evidence associating a tick-bite with the initial lesion where this occurs. However, only *Rhipicephalus simus* and *Haemaphysalis leachi* have been obtained on rats from this area, and neither species has been taken on human beings, so that a rodent reservoir or ecto-parasite appeared to be ruled out if a tick vector could be incriminated. The dogs in the area, when searched, have been found to be heavily infested with *H. leachi* and very few *R. sanguineus*. Only one report was received during the year of the latter species being taken from a human being. *R. pulchellus* in the larval and nymphal stages, and also the male adults, attack human beings freely; their hosts are the wild game of the Athi Plains which invade this particular district during dry periods of the year.

It seemed possible that *R. pulchellus*, either in the larval or nymphal stages or as the adult male, might prove to be the carrier of tropical typhus, and in order to test this hypothesis, numerous attempts at transmission have

been carried out; these, however, have all proved negative. In spite of the failure in experimental transmission, the circumstantial evidence obtained is strong enough to warrant a continuance of the tests. At the end of the year, a patient whose evidence can be relied on, selected a male *R. pulchellus* from amongst others, as being similar to the one he removed from the site of his primary lesion.

In August, a house reported as heavily infested with ticks, was investigated. Large numbers of *Rhipicephalus sanguineus* were taken in various stages of development from door frames, walls and cracks in the paint. In September, premises where cases of tropical typhus had occurred, were investigated in Mombasa. Each of the patients from these houses gave the same history—each had suffered heavily from tick bites on body and legs and associated the primary lesion with the removal of a tick or its bite. Large numbers of *R. sanguineus* were recovered from those parts of the houses to which dogs had access.

During November, an investigation was made in the Naivasha district where five cases of tropical typhus had occurred in one house. A rodent and flea survey of the area was carried out and ticks were collected from rodents, dogs, game and houses. Representative numbers of the fleas and ticks obtained from various areas were emulsified in saline and injected intraperitoneally into male guinea-pigs. From the particular house where cases had occurred, three female *R. sanguineus* and three female *R. leachi* were obtained from dogs; these were inoculated into male guinea-pigs, and though the *R. leachi* produced no reaction, a scrotal swelling was noted on the sixth day in the pig inoculated with *R. sanguineus*. Inoculations with ticks and fleas obtained from other sources were negative. It is relevant to note that the last case of tropical typhus had occurred at this house eight months previously. Dr. H. D. Tonking has confirmed the finding that tropical typhus rickettsiae were obtained in *R. sanguineus* from this source.

In December, tropical typhus was contracted by a six year old child living in Nairobi. An immediate search was made of the house and especially of those places where a young dog usually rested. From the chairs on the verandah where the dog sometimes spent the night, no ticks were obtained, but from the door frames and cracks in the cement immediately above these chairs, one newly emerged female and fifteen engorged nymphal *R. sanguineus* were found. From the dog, one male *H. leachi* and two male, one female and one nymphal *R. sanguineus* were taken. The specimens of *R. sanguineus* from the house and dog respectively were inoculated in two separate batches into male guinea-pigs. The ticks from the dog failed to cause a reaction in the pigs, but those from the house caused scrotal swelling on the fifth day. This reaction which is typical of tropical typhus infection in guinea pigs, was confirmed histologically by the finding of rickettsiae and biologically by further passages into other pigs.

The vector of one form of tropical typhus in Kenya has thus been established as *R. sanguineus* but as suggested above, *R. pulchellus* also appears to call for more detailed investigation. All experimental animals with suspicious reactions or those with scrotal swellings were handed over to Dr. H. D. Tonking, who showed that the rickettsiae obtained from guinea-pigs which were inoculated with *R. sanguineus* were identical morphologically with those already proved to be the cause of tropical typhus in human beings.

5.—Rats, Fleas and Plague.

Rat and flea studies have been continued in Nairobi Township and at Keruguya. A survey of the area between Maseno and Sio in Central Kavirondo was carried out.

An investigation has been made into the possibilities of carriage of rats and fleas in cotton seed from Uganda, this work being carried out at Mombasa. One hundred and one trucks containing cotton seed, twelve trucks with cotton lint in bales and two trucks with hides were examined. Eighty-three trucks with cotton seed came direct from stations in Uganda, and eighteen contained seed transhipped at Kisumu from barges. Search was made for damage by rats and for rat faeces on bags, but there were no indications that rats had gnawed holes or damaged the seed. Rats and guinea-pigs were released in trucks before and after unloading.

Only one live *Rattus rattus* was captured : this had been nine days in transit and had 1 f. *X. brasiliensis*. From white rats and guinea-pigs released in the trucks, 4 m. and 4 f. *X. brasiliensis* were collected.

Owing to the failure to observe signs of rat damage to cotton seed, further investigations were carried out at the Laboratory to test the ability of *Rattus rattus* to exist solely on this food. It was found that rats caught in Nairobi which were fed entirely on cotton seed, died of gossypol poisoning in about three to four days, but tolerated very small quantities of the seed when given with other foodstuffs. Most rats refused to eat cotton seed even when kept on very short rations of cereals, and none were found to prefer this food to cereals. A survey was then made of *Rattus rattus* in a cotton-growing area in Kenya, and the rats obtained from this district were tested for their tolerance to cotton seed. The same results were again obtained and show fairly conclusively that *Rattus rattus* does not prefer cotton seed to cereals, and eat only very small quantities, and certainly do not thrive upon such fare. However, these rats from a cotton growing area did show a greater tolerance to cotton seed than did those from Nairobi Township. There is therefore apparently little danger to be expected from rats in stored cotton seed ; such food is but supplementary and obviously only taken in the almost entire absence of cereals. Should rats subsist solely on cotton seed, the greater percentage would be killed by gossypol poisoning, and it would act as a natural control to their numbers. An analysis has been made of the available figures for the incidence of plague and the cotton yield per acre and the total annual cotton yields for such a large producing country as Uganda. The figures show no relationship to one another.

The preliminary results of experimental transmission of plague from rat to rat by the agency of fleas appear to confirm the view that *X. brasiliensis* and *X. cheopis* are the true vectors of plague. The fact that *C. cabirus* and *D. lypusus* have on occasion transmitted plague under experimental conditions cannot be accepted as proof that they do so in nature, and the large numbers of these species taken from field rodents and tested by experimental transmission with negative results during a period when plague was epidemic in Nairobi, appear to confirm the view that they do not play any part in the epidemiology of plague. The most remarkable feature of experimental transmission work has been the success gained by comparatively small numbers of fleas ; in one instance, five *C. cabirus* were successful.

From the evidence available over a considerable number of years, it is apparent that :—

- (a) The species of rodent mostly concerned in enzootic and epizootic plague in townships is *Rattus rattus*, and
- (b) that the main ecto-parasite of this rat is *X. brasiliensis* in Kenya endemic centres.

Other species of fleas, though often numerically greater than *X. brasiliensis* appear to play an insignificant part, if any, in plague enzootics. In connexion with the suggestion that *Rattus rattus* alone is held responsible for plague outbreaks, the figures submitted by the *Bacteriological Section* in the annual report for 1931 (p. 17) may be repeated to advantage. "Thirty-nine out of one hundred and sixty-two rats, all *R. rattus*, found dead in Nairobi

district, were demonstrated to have plague infection. A total of two thousand seven hundred and fifty rats, nearly all field rodents, of the three commonest species, *R. coucha*, *Arvicathis* and *Otomys*, have been examined with negative results."

Field rodents do contract plague and succumb to the disease in very small numbers, either in nature or under experimental conditions. Transmission experiments carried out here have shown that the four species of fleas employed are all capable of transmitting the disease. The evidence for other parts of the world is similar, that any flea species seems capable of transmitting the disease and almost any species of rodent may succumb. The answer to the question; what constitutes the degree of vulnerability or otherwise in rat and flea species is apparently the main problem to be solved in plague epidemiology. In East Africa there are indications that the exclusiveness or otherwise of a flea species to the blood diet of *R. rattus* contributes to the susceptibility of that species, and that the relative resistance exhibited by a flea species depends on other sources of blood which it obtains. There are also suggestions that the resistance to plague infection exhibited by field rodents is in some way connected with types of food in a similar manner to that observed in human communities.

6.—Myiasis.

During the year a list of the *Muscidae* and *Oestridae* which have been recorded in Kenya as causing myiasis in man and animals, was published in the *Kenya Medical Journal*. It was published as an appeal to any interested persons for more material by demonstrating the meagreness of our collection. The appeal is reiterated as but little additional material has been sent in.

Most of the specimens submitted for identification as having been removed from ulcers have again proved to be *Phenicia (Lucilia) sericata*, Mg., and it appears that this species may be regarded as the commonest myiasis-producing insect in Kenya.

During the year a notable increase of *Cordylobia anthropophaga* was observed, first among field rodents, then dogs and finally human beings. Reports were also received of outbreaks in the Coastal and Kavirondo areas. The outbreaks are noted to occur mostly during the long rains, and there are indications of long term periodicity following seasonal heavy rainfall.

7.—Fumigation.

It is gratifying to record that the Zyklon method of fumigation which was recommended for use in disinfesting the carriages on the Kenya and Uganda Railways has proved very satisfactory in practice. Complaints of bed bugs in coaches have been remarkably rare, and on investigation such coaches were always found to have a local infestation in one compartment introduced since the previous fumigation.

The work which has been carried out with Cyanogas, as a control for rats and fleas in native huts, has unfortunately not been developed to the extent hoped for during the year. Further progress has been made in obtaining a suitable pump, and the troubles formerly associated with the unsatisfactory pumps originally provided for this work are now happily overcome. The Cyanogas "Brass Foot Pump" provided by the makers of Cyanogas is extremely light and easily handled, is very efficient, and permits a considerable reduction in man power.

8.—Vesicular Dermatitis caused by Paederus Beetles.

A few preliminary observations have been made on *Paederus crebri-punctatus*, Epp. commonly known as "Nairobi Fly". An acute inflammatory condition results from rubbing the juices of this beetle on the skin, and some observers state that ulceration may ensue if the irritation is in the neighbourhood of serous membranes. In some cases noted, where the lesion was

in the region of the eye, there was severe conjunctivitis followed by suppuration. Children have been reported to suffer from dermatitis following the crushing of the insect in their clothes.

Paederus spp. are abundant during the period following the long rains, July and August, and up to the present have been found most prevalent in the long grass bordering small streams.

Seven adult *Paederus crebripunctatus* ground up alive in 10 cc. 2 per cent alcohol in distilled water, and the emulsion painted on the skin of the forearm to form the initials "J.I.R." has persisted and is distinguishable after six months as a red pigmentation.

The following dates give an indication of the virulence of the juices obtained when it is realized that only one insect was emulsified in approximately 1.5 cc. of fluid.

3-8-32 : Emulsion painted on arm.

4-8-32 : Slight inflammatory reaction.

5-8-32 : Inflammatory reaction more marked.

6-8-32 : Papules commencing in the inflamed area, with a slight systemic reaction consisting of malaise and headache.

7-8-32 : Papules coalescing over inflamed surface. Pains in joints and back, severe headache and sickness.

8-8-32 : Pus present and treatment commenced with "fomentations" of magnesium sulphate.

9-8-32 : Local and general condition much improved.

At the end of six months pigmentation of the skin over the affected area was still present.

These insects have been recorded from many areas in Kenya, and it is believed, judging from these preliminary observations, that their presence may be of some clinical importance in those areas where conjunctivitis and corneal ulceration and opacity among native tribes is so prevalent.

9.—Maggot Treatment of Ulcers.

Production of larvae of *L. sericata* for the treatment of ulcers has been proceeding for some months. For the greater convenience of medical officers and nursing sisters a supply of saline extract of the larvae is being produced, and supplies are under test at various stations. The few tests in Nairobi have proved the success of the treatment.

10.—Conjunctivitis.

Preliminary collections of common flies have been made in connexion with a proposed investigation of the widespread conjunctivitis found among stock-farming tribes such as the Masai.

11.—Acknowledgments.

We desire to record our appreciation of the help obtained from Sir Guy Marshall, Dr. Neave and the staff of the Imperial Institute of Entomology, Dr. Evans and Professor Patton of the Liverpool School, and Dr. Edward and others of the staff of the British Museum of Natural History.

I.—BIOCHEMICAL SECTION.

1.—Staff.

The staff has consisted of the Biochemist, an Indian Laboratory Assistant, and two native attendants. For a short time at the beginning of the year and for the month of December Mr. H. M. Nefdt, Laboratory Assistant, was attached to the Section.

2.—Routine Work.

The nature and number of the routine examinations carried out during the year are given in the following table :—

(a) Urines.

General examination, i.e. reaction, specific gravity, albumin, sugar, and microscopic examination of deposit	... ...	810
Sugar—quantitative and qualitative	... ...	27
Albumin—quantitative and qualitative	... ...	17
Albumin and sugar—qualitative	... ...	13
Albumin and deposit	... ...	4
Deposit	... ...	7
Urea	... ...	2
Bile	... ...	2
Urea concentration tests (McLean)	... ...	20

(b) Faeces.

Occult blood	... ...	55
Fat content	... ...	2
Bile	... ...	1

(c) Blood.

Glucose tolerance tests	... ...	14
Non-protein nitrogen	... ...	12
Uric acid	... ...	15
Sugar	... ...	6
Calcium	... ...	2
Van den Bergh test	... ...	1

(d) Cerebro-spinal fluid.

Lange gold curves	... ...	21
Protein excess	... ...	5

(e) Miscellaneous.

Fractional test meals	... ...	38
Human milk	... ...	2
Vomit	... ...	1

Total number of examinations ... 1,083

The preparation of metallic bismuth and bismuth oxide suspensions has been continued, and during the year 161,920 doses of the former and 13,493 doses of the latter have been sent to Medical Stores for issue to medical officers throughout the country. These show considerable increases over last year's quantities, and are almost double the amounts issued in 1930. The laborious and somewhat tedious work in this connexion has been carried out by Mr. Ramji Das in addition to his other duties.

3.—Research Work.

The lack of continued help from a well-trained and enthusiastic laboratory assistant has been the limiting factor in the research programme of the Section. According to the policy adopted in the Laboratory no full-time assistant is assigned to the Biochemistry Section, and any help is of a somewhat temporary nature and not suited to the carrying to completion of the particular lines of work taken up. Certain work that was undertaken had to be abandoned for these reasons, and the only investigational work carried out

was by the Biochemist in the intervals between routine examinations which required his personal attention. In view of the variety of biochemical problems awaiting attention this state of affairs is to be deplored.

Work on the composition of locally-grown foodstuffs has been continued, and a start has been made in the building up of a strain of white rats suitable for the assay of their vitamin contents.

J.—REPORT OF GOVERNMENT ANALYST'S SECTION.

LIST OF SAMPLES EXAMINED

Waters	35	Chiefly Domestic Supplies ..
Milks	62	{ Control Nairobi Milk Supply 32 Control Nakuru Milk Supply 24 Miscellaneous 6
Oils, Fats and Waxes .. . .	..	.. . . . . 4
Minerals .. . .	..	.. . . . . 37
Toxicological .. . .	..	.. . . . . 97
Forensic Chemical Exhibits ..	..	.. . . . . 105
Foods	3	Public Health Control .. Nil
Liquors .. . .	..	.. . . . . 25
Miscellaneous	62	Including drugs, larvicides, bituminous preparations, disinfectants and ink.

APPENDIX.

**RESUME OF WORK CARRIED OUT AT THE CLINICAL LABORATORY
ATTACHED TO THE NATIVE HOSPITAL, MOMBASA,
DURING THE YEAR 1932.**

1.—Staff.

European.—Mr. W. L. Titman was in charge until June, 1932, when he was transferred to Nairobi, being relieved by Mr. E. C. Young.

African Staff.—This remained the same throughout the year. (One laboratory assistant and one learner.)

2.—Examinations.

During the year 12,028 specimens were received and dealt with in the laboratory, an increase of 648 specimens over the previous year.

The sum of Sh. 1,260 was collected on account of examinations performed for medical practitioners engaged in private practice.

3.—Blood Examinations.

Slides examined for malarial parasites.

(a) Negative	...	...	...	...	...	...	3,826
(b) <i>P. falciparum</i> including 47 crescents	...	...	...	...	...	...	1,187
(c) <i>P. malariae</i> alone	...	...	...	...	...	...	46
(d) <i>P. vivax</i> alone	...	...	...	...	...	...	11
(e) Mixed infections	...	...	...	...	...	...	19

Other parasites.

(a) <i>S. rossi</i>	...	...	...	...	...	...	5
(b) <i>Microfilaria</i> , unsheathed	...	...	...	...	...	...	17
(c) <i>Microfilaria</i> , sheathed	...	...	...	...	...	...	31

Other examinations.

(a) Total counts	...	...	...	...	...	...	58
(b) Differential counts	...	...	...	...	...	...	210
						Total	...
						5,410	—

4.—Faeces Examinations.

Two thousand, seven hundred and sixty-nine specimens of stools were examined for helminths or protozoa. Of these, 762 were negative and 2,007 showed infection with one or other or both.

There were many cases of infection with three and four helminths. Over a period of six months it has been noticed that protozoa do not occur as frequently in the Coast District as in the Highlands; *Ancylostoma duodenale* is the predominating helminth.

The number of times the various helminths and protozoa were identified is as follows:—

<i>Ancylostoma duodenale</i>	...	...	...	...	...	...	1,209
<i>Trichuris trichiura</i>	...	...	...	...	...	...	899
<i>Ascaris lumbricoides</i>	...	...	...	...	...	...	636
<i>Taenia</i>	...	...	...	...	...	...	384
<i>Strongyloides stercoralis</i>	...	...	...	...	...	...	104
<i>Schistosoma mansoni</i>	...	...	...	...	...	...	60
<i>Schistosoma haematobium</i>	...	...	...	...	...	...	1
<i>Enterobius vermicularis</i>	...	...	...	...	...	...	11
<i>Entamoeba coli</i>	...	...	...	...	...	...	381
<i>Entamoeba histolytica</i>	...	...	...	...	...	...	33
<i>Giardia intestinalis</i>	...	...	...	...	...	...	80
<i>Iodamocba butschlii</i>	...	...	...	...	...	...	17
<i>Chilomastix mesnili</i>	...	...	...	...	...	...	2
<i>Endolimax nana</i>	...	...	...	...	...	...	1
<i>Isospora hominis</i>	...	...	...	...	...	...	1
Flagellate cysts (undifferentiated)	...	...	...	...	...	...	31

In addition to the above, five further examinations on faeces were carried out as follows :—

One specimen was examined for the tubercle bacillus and found positive.

Four specimens were examined for the presence of occult blood.

5.—Serological Examinations.

(a) Widal's test was carried out on 187 samples of serum. The results are as follows, taking as the standard, an agglutination titre of one in fifty or higher, using Dreyer's technique.

Negatives	...	...	...	...	...	...	118
<i>B. typhosus</i> alone	...	...	...	...	...	...	51
<i>B. paratyphosus</i> "A" alone	...	...	...	...	...	...	2
<i>B. paratyphosus</i> "B" alone	...	...	...	...	...	...	1
Group agglutinations	...	...	...	...	...	...	15

In addition one specimen was sent to Nairobi for agglutination against *B. abortus*.

(b) Two hundred and nineteen specimens of blood were received, the sera pipetted off and forwarded to Nairobi for the Wassermann, Kahn or Sigma test.

6.—Bacteriological Examinations.

One hundred and forty-nine specimens requiring cultural examination were received. These were dealt with and forwarded to Nairobi when necessary for further investigation or vaccine preparation. The following are the particulars :—

Faeces cultures	...	...	...	...	...	...	75
Urine cultures	...	...	...	...	...	...	43
Blood cultures	...	...	...	...	...	...	13
Throat swabs	...	...	...	...	...	...	11
Miscellaneous cultures	...	...	...	...	...	...	7

7.—Microscopical Examinations.

(a) *Gonorrhoea*.—Two hundred and fifty-five specimens of urethral exudate were examined. Of these 138 were positive for *Neisseria gonorrhoeae*.

(b) *Lymph from chancres*.—One hundred and nineteen specimens were received. *S. pallida* was identified in twenty-three.

(c) *Leprosy*.—Five skin scrapings were received, all of which were negative. One nasal smear was positive for *M. leprae*.

(d) *Sputum*.—Four hundred and ninety-seven specimens of sputa were received and examined with the following results :—

(e) *Plague*.—Four hundred and fifty-eight smears from rats either trapped or found dead were examined for the presence of *P. pestis*, all of which were negative. One rat was sent for post-mortem examination and was found negative for the above organism.

(f) *Cerebro-spinal fluid*.—Six specimens were received. One showed the presence of *N. meningitidis*, and one the pneumococcus.

(g) *Anthrax*.—One exudate was examined and found negative for *B. anthracis*.

(h) *Pus from liver*.—One specimen was examined and found to contain *Entamoeba histolytica*.

(i) *Miscellaneous smears*.—Fifty-two smears from various sources were examined.

8.—Urines.

Two thousand and thirteen specimens of urine were received and examination of the same carried out as follows :—

General	...	...	...	...	...	...	1,975
Albumin content	...	...	...	...	...	...	21
Sugar content	...	...	...	...	...	...	21
Urea estimation	...	...	...	...	...	...	2
For <i>N. gonorrhoeae</i> , negative	...	...	...	...	...	...	9
For <i>N. gonorrhoeae</i> , positive	...	...	...	...	...	...	1
For tubercle bacillus	...	...	...	...	...	...	1

Schistosoma haematobium was found in eighty-three specimens.

9.—Water Analyses.

Four bacteriological examinations of water were carried out, three of the Mombasa water supply and one from a well. The preliminary results of these were forwarded to Nairobi with sub-cultures, where the examination was completed.

10.—Pathological Examinations.

Fifty-five specimens were forwarded to Nairobi for histological examination.

11.—Post-mortems.

Twenty-six post-mortems were carried out. The causes of death were as follows :—

Abscess of liver	...	...	...	...	...	...	1
Anaemia	...	...	...	...	...	...	1
Gastro-enteritis	...	...	...	...	...	...	1
Haemorrhage	...	...	2				
Haemorrhage, post operative	1	...	...	...	...	...	3
Malaria	...	...	...	...	...	...	1
Pneumonia—lobar	...	...	...	...	...	...	3
Pericarditis	...	...	...	...	...	...	1
Sclerosis	...	...	...	...	...	...	1
Septicaemia	...	...	...	...	...	...	3
Typhoid fever	...	...	...	...	...	...	4
Tuberculosis—							
pulmonary	...	1					
brain	...	1					
and pneumonia	1	...	...	...	...	...	3

Tumours—

carcinoma of alimentary tract	2
carcinoma of liver	...
1	...
...	3
Violence—knife wounds	...
...	...
...	1
Violence—knife wounds	...
...	...
...	1

Active tuberculosis lesions were found in two cases, but were not the cause of death.

12.—Biological and Toxicological.

(a) Three protein-free filtrates of blood were prepared and sent to Nairobi for sugar estimation.

(b) One stomach and contents were taken from a post-mortem case and sent to Nairobi for evidence of poisoning.

